STANDBY LIQUID CONTROL SYSTEM (SLCS)

System (No): Standby Liquid Control System (48)

Component Description: Standby Liquid Control Pumps

ID Nos.: 1AP208, 1BP208, 1CP208, 2AP208, 2BP208, 2CP208

P&ID/COORD (respectively): M-48 (SHT 1) / E-5, M-48 (SHT 1) / C-5, M-48 (SHT 1) / B-5, M-48 (SHT 2) / E-5, M-48 (SHT 2) / C-5, M-48 (SHT 2) / B-5

Pump Type: Positive Displacement **Test Parameters:** P, Q, V

Relief Request: GPRR-3

Remarks: Relief request GPRR-3 allows the use of ultrasonic flow measurement devices without compliance to the ± 2% accuracy requirements of the Code.

Safety Function(s): The Standby Liquid Control System (SLCS) Pumps have an active safety function to pump sodium pentaborate neutron absorber into the Reactor if the Reactor cannot be shut down or maintained shut down with the control rods. In addition to the safety design basis requirements, the NRC Anticipated Transient Without Scram (ATWS) Rule 10CFR50.62 requires that the SLC system have the capability of injecting a borated water solution into the Reactor Pressure Vessel for Reactor plant protection against an ATWS. Each SLCS pump shall be capable of delivering no less than 41.2 gal/min against a system head of ≥ 1205 psig to be considered operable. This flow rate is based on the original system design requirement that a single standby liquid control pump be capable of shutting down the Reactor from the most reactive condition at any time in core life and maintaining it subcritical during cooldown with all control rods withdrawn in the rated power pattern. This minimum flow rate also ensures that the simultaneous operation of both pumps, utilizing a required minimum sodium pentaborate concentration of 13%, will result in an equivalent boron injection capability that exceeds ATWS Rule requirements.

The SLCS is manually initiated by a key-lock switch in the Control Room when the operator determines that normal reactivity control systems have not shutdown the Reactor. All three loops of the SLCS can also be automatically initiated by the Redundant Reactivity Control System (RRCS) after a time delay. Reactor vessel low water level - Level 2(trip setpoint ≥ -38 inches), or manual initiation of the RRCS immediately starts a timer. A signal will be sent to initiate the SLCS if, at the expiration of a 118 second time delay, the core power is not downscale as measured by the APRM system. Initiation of the SLCS requires start signals from both channels A and B of either division of RRCS. Receipt of these signals causes the squibs to fire, opens the explosive valves, and starts the SLCS pumps. All three pumps will inject boron solution into the vessel until the storage tanks reach low level tripping the pumps. The SLCS utilizes Loop B of the Core Spray as an injection flow path.

The SLC system is required to be operable in the event of a loss of normal station power. Therefore the pumps, valves, and controls are powered from the standby a-c power supply in the absence of normal power. The pumps and valves are powered and controlled from separate busses and circuits so that a single failure will not prevent system operation.

Test Requirement(s):

Quarterly pump testing.

References:

1. LGS Technical Specification 3/4.1.5 and Bases
2. LGS Technical Specification Table 3.3.2-2
3. UFSAR Section 7.1.2.1.18, SLCS - Instrumentation and Controls
4. UFSAR Section 7.4.1.2, SLCS - Instrumentation and Controls
5. UFSAR Sections 7.6.1.8.3.4, SLCS - Instrumentation and Controls
6. UFSAR Section 9.3.5, Standby Liquid Control System
7. UFSAR Section 15.0, Accident Analysis
8. Design Baseline Document L-S-38, Standby Liquid Control System

System (No): Standby Liquid Control System (48)

Component Description: SLC Injection Line Inboard Check Valve

ID Nos.: 48-1027, 48-2027

P&ID/COORD (respectively): M-48 (SHT 1) / G-8, M-48 (SHT 2) / G-8

Code Class: 1 **Category:** C **Active/Passive:** A

Size: 2.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal C Safety O Failsafe -

Test Frequency (Direction): ET-R(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: 48-ROJ-1

Remarks: Refueling outage justification 48-ROJ-1 allows forward exercising to be performed during injection testing due to the requirement to fire a squib valve and inject cold water into the Reactor Vessel.

Safety Function(s): These check valves are located in the SLCS injection line to the Reactor Vessel and perform an active safety function in the open position to provide a path for SLCS injection flow. This function ensures shutdown capability in the event the Reactor cannot be shut down or maintained in a shut down condition by the control rods. The maximum flow these valves must be capable of passing is the amount generated during two pump operation to meet ATWS conditions.

These valves do not perform a safety function in the closed position. Adequate isolation between the RCS and the SLCS is provided by the designated inboard/outboard PCIVs which are identified in UFSAR Table 6.2-17 for Penetrations X-42 and X-116.

Test Requirement(s):

Check valve exercise test to the open position during refueling

Reference(s):

1. LGS Technical Specification 3/4.1.5
2. UFSAR Section 7.4.1.2, SLCS - Instrumentation and Controls
3. UFSAR Section 9.3.5, Standby Liquid Control System
4. UFSAR Section 15.0, Accident Analysis
5. Design Baseline Document L-S-38, Standby Liquid Control System

System (No): Standby Liquid Control System (48)

Component Description: SLC Injection Line Check Valve - Inboard PCIV

ID Nos.: 48-1F007, 48-2F007

P&ID/COORD (respectively): M-48 (SHT 1) / F-8, M-48 (SHT 2) / F-8

Code Class: 1 **Category:** A/C **Active/Passive:** A

Size: 2.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_C_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): ET-R(F&R) **Appendix J, Type C:** Y
LJ-B

VRR/VCS/ROJ: 48-ROJ-1

Remarks: Refueling outage justification 48-ROJ-1 allows forward exercising to be performed during injection testing due to the requirement to fire a squib valve and inject cold water into the Reactor Vessel.

Safety Function(s): These check valves are located in the SLCS injection line to the Reactor Vessel and perform an active safety function in the open and closed positions.

These valves must be capable of opening to provide a path for SLCS injection flow. This function ensures shutdown capability in the event the Reactor cannot be shut down or maintained in a shut down condition by the control rods. The maximum flow these valves must be capable of passing is the amount generated during two pump operation to meet ATWS conditions.

These valves also perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as inboard containment isolation valves for Penetrations X-42 and X-116. As such, the valves must be capable of closure to maintain containment integrity and RCS pressure boundary isolation.

Test Requirement(s):

Check valve exercise test to the open and closed positions during refueling
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.1.5
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 7.4.1.2, SLCS - Instrumentation and Controls
6. UFSAR Section 9.3.5, Standby Liquid Control System
7. UFSAR Section 15.0, Accident Analysis
8. Design Baseline Document L-S-38, Standby Liquid Control System

System (No): Standby Liquid Control System (48)

Component Description: SLC Pump Discharge Check Valves

ID Nos.: 48-1F033A, 48-1F033B, 48-1F033C,
48-2F033A, 48-2F033B, 48-2F033C

P&ID/COORD (respectively): M-48 (SHT 1) / E-6, C-6, B-6,
M-48 (SHT 2) / E-6, C-6, B-6

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.50 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_C_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): ET-Q(F&R) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These check valves are located in the SLC pump discharge lines and perform an active safety function in the open and closed positions.

The valves must open upon SLC pump initiation to provide a flow path for boron solution to the Reactor Vessel. The valves must be capable of passing a minimum flow rate of 41.2 gpm for the associated SLC pump to accomplish its design safety function. This flow rate is based on the system design requirement that a single standby liquid control pump be capable of shutting down the Reactor from the most reactive condition at any time in core life and maintaining it subcritical during cooldown with all control rods withdrawn in the rated power pattern.

These check valves also perform an active safety function in the closed position to prevent bypass flow from one pump in case of relief valve failure in the line from the other pump. Failure of the check valve to close in conjunction with a failure of the pump discharge relief valve would compromise the ability of the SLCS to fulfill its required safety function.

Test Requirement(s):

Quarterly check valve exercise test to the open and closed positions

Reference(s):

1. LGS Technical Specification 3/4.1.5
2. UFSAR Section 7.4.1.2, SLCS - Instrumentation and Controls
3. UFSAR Section 9.3.5, Standby Liquid Control System
4. UFSAR Section 15.0, Accident Analysis
5. Design Baseline Document L-S-38, Standby Liquid Control System

System (No): Standby Liquid Control System (48)

Component Description: SLC Injection Line Manual isolation Valve

ID Nos.: 48-1F036, 48-2F036

P&ID/COORD (respectively): M-48 (SHT 1) / F-8, M-48 (SHT 2) / F-8,

Code Class: 1 **Category:** B **Active/Passive:** P

Size: 2.00 **Valve Type:** GL **Act. Type:** MA

Positions: Normal LO Safety O Failsafe AI

Test Frequency (Direction): PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These locked open manual valves are located in the SLCS injection line downstream of inboard PCIV F007. They perform a passive safety function in the open position to allow SLCS flow to be injected into the reactor vessel. They are equipped with remote position indication.

These valves do not perform a safety function in the closed position. They are provided for isolation of the inboard/outboard primary containment isolation valves, F007 and F006A&B during maintenance and testing. They are not closed during normal operations or during transient or accident conditions.

Test Requirement(s):

Position indication verification at least once every 2 years

Reference(s):

1. LGS Technical Specification 3/4.1.5
2. UFSAR Section 7.4.1.2, SLCS - Instrumentation and Controls
3. UFSAR Section 9.3.5, Standby Liquid Control System
4. UFSAR Section 15.0, Accident Analysis
5. Design Baseline Document L-S-38, Standby Liquid Control System

System (No): Standby Liquid Control System (48)

Component Description: SLC Injection Line Stop Check Valve - Outboard PCIV

ID Nos.: HV-48-1F006A, HV-48-1F006B, HV-48-2F006A, HV-48-2F006B

P&ID/COORD (respectively): M-48 (SHT 1) / E-8, D-8 M-48 (SHT 2) / E-8, D-8

Code Class: 1 **Category:** A/C **Active/Passive:** A

Size: 2.00 **Valve Type:** SK **Act. Type:** MO

Positions: Normal C Safety OC Failsafe AI

Test Frequency (Direction): ET-R(F), ET-Q(R), ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 48-ROJ-1

Remarks: Refueling outage justification 48-ROJ-1 allows forward exercising to be performed during injection testing due to the requirement to fire a squib valve and inject cold water into the Reactor Vessel.

Safety Function(s): These motor-operated stop-check valves are located in the SLCS injection lines to the Reactor Vessel and perform an active safety function in the open and closed positions.

These valves must be capable of opening by flow and, if closed, by remote manual switch actuation of the motor-operator, upon SLC pump initiation, to provide a path for SLCS injection flow. This function ensures shutdown capability in the event the Reactor cannot be shut down or maintained in a shut down condition by the control rods. The maximum flow these valves must be capable of passing is the amount generated during two pump operation to meet ATWS conditions.

These valves also perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17y as outboard containment isolation valves for Penetrations X-42 and X-116. As such, they must be capable of closure by remote manual switch actuation to maintain containment integrity and RCS pressure boundary isolation. They have a maximum isolation time of 60 seconds.

The valve motor-operators receive their power from separate Class 1E ac emergency buses to ensure operability during a loss of offsite power and to satisfy single failure criteria.

Test Requirement(s):

Check valve exercise test to the open position during refueling
Quarterly check valve exercise test to the closed position
Quarterly stroke time test of motor operator to the open and closed positions
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.1.5
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 7.1.2.1.18, SLCS - Instrumentation and Controls
6. UFSAR Section 7.4.1.2, SLCS - Instrumentation and Controls
7. UFSAR Sections 7.6.1.8.3.4, SLCS - Instrumentation and Controls
8. UFSAR Section 9.3.5, Standby Liquid Control System
9. UFSAR Section 15.0, Accident Analysis
10. Design Baseline Document L-S-38, Standby Liquid Control System

System (No): Standby Liquid Control System (48)

Component Description: SLC Pump Discharge Relief Valves

ID Nos.: PSV-48-1F029A, PSV-48-1F029B, PSV-48-1F029C,
PSV-48-2F029A, PSV-48-2F029B, PSV-48-2F029C

P&ID/COORD (respectively): M-48 (SHT 1) / E-6, D-6, B-6,
M-48 (SHT 2) / E-6, D-6, B-6

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 0.75 **Valve Type:** RL **Act. Type:** SA

Positions: Normal_C_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): RT-P3 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These relief valves are located in the SLC pump discharge lines and perform an active safety function to provide overpressure protection to SLCS piping and components. The pump and system design pressure between the explosive valves and the pump discharge is 1400 psig. Each SLC system relief valve is set at 1375 psig. This setpoint ensures overpressure protection to SLCS pump discharge piping in the event an SLCS pump is started with an obstructed discharge flow path, while providing sufficient pressure margin to assure solution injection into the Reactor. The NBS safety/relief valves begin to relieve pressure above approximately 1130 psig. Therefore, the SLC positive displacement pumps cannot overpressurize the nuclear system.

Test Requirement(s):

Relief valve test once every 10 years

Reference(s):

1. LGS Technical Specification 3/4.1.5
2. UFSAR Section 7.4.1.2, SLCS - Instrumentation and Controls
3. UFSAR Section 9.3.5, Standby Liquid Control System
4. UFSAR Section 15.0, Accident Analysis
5. Design Baseline Document L-S-38, Standby Liquid Control System

System (No): Standby Liquid Control System (48)

Component Description: SLCS Injection Squib Valve

ID Nos.: XV-48-1F004A, XV-48-1F004B, XV-48-1F004C,
XV-48-2F004A, XV-48-2F004B, XV-48-2F004C

P&ID/COORD (respectively): M-48 (SHT 1) / E-7, C-7, B-7,
M-48 (SHT 2) / E-7, C-7, B-7

Code Class: 2 **Category:** D **Active/Passive:** A

Size: 1.50 **Valve Type:** EX **Act. Type:** EX

Positions: Normal_C_ Safety_O_ Failsafe_AI_

Test Frequency (Direction): XT-P4 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed explosive-actuated valves are located in the SLCS pump discharge lines. They perform an active safety function in the open position to allow injection of borated water into the Reactor Vessel. Initiation of the SLCS starts the three SLC injection pumps and actuates these valves. Each squib valve is interlocked with its associated SLC pump to automatically open upon pump start. The squib valves are actuated by an explosive charge with dual ignition primers inserted in the side chamber of the valve. Firing of either or both of the ignition primers will open the valve. This feature provides assurance of valve opening when needed. The valves remain open once the squib are fired. A trickle current continuously monitors continuity of the firing mechanism of the squib valves. The explosive valve circuitry is supplied from alternate Class 1E 120Vac power independent of the power source for the SLCS pumps.

These valves have no safety function in the closed position. They are not containment isolation valves, pressure isolation valves, or Reactor Coolant boundary isolation valves. By design, once these valves have been actuated to perform their safety function, they are not capable of reclosure. The valves do perform the non-safety related process function of preventing inadvertent injection of boron solution into the Reactor Vessel during quarterly pump testing.

Test Requirement(s):

Explosive valve test per T.S. 4.1.5.d.1 and the applicable sections of the Code

Reference(s):

1. LGS Technical Specification 3/4.1.5 and Bases
2. UFSAR Section 7.4.1.2, SLCS - Instrumentation and Controls
3. UFSAR Section 9.3.5, Standby Liquid Control System
4. UFSAR Section 15.0, Accident Analysis
5. Design Baseline Document L-S-38, Standby Liquid Control System

REACTOR CORE ISOLATION COOLING (RCIC) SYSTEM

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: Reactor Core Isolation Cooling (RCIC) Pumps

ID Nos.: 1OP203, 2OP203

P&ID/COORD (respectively): M-50 (SHT 1) / E-6, M-50 (SHT 2) / E-6

Pump Type: Centrifugal **Test Parameters:** D/P, Q, V

Relief Request: GPRR-2

Remarks: Relief request GPRR-2 provides for exemption from individual instrument accuracy and full-scale range requirements provided the applicable instrument(s) are accurate to at least ± 6% at the reference value.

Safety Function(s): The Reactor Core Isolation Cooling system provides safe shutdown capability by means of automatic or remote manual actuation to maintain or supplement Reactor Vessel coolant inventory so that the integrity of the fuel barrier is not compromised during the following events:

- Reactor Vessel isolation, accompanied by a loss of normal coolant flow from the Reactor Feedwater System

- A plant trip in which normal Feedwater System flow is lost before the Reactor is depressurized to a level where the shutdown cooling mode of the Residual Heat Removal (RHR) System can be put into operation

The RCIC System also provides backup to the HPCI System for supplying water to the Reactor Vessel in the event of a small break LOCA, thereby satisfying single failure criteria. In conjunction with the Residual Heat Removal System, the RCIC System has the capability of maintaining the Reactor in the hot standby condition.

Upon loss of Feedwater flow, Reactor water level decreases rapidly causing a Reactor low water level scram. Following the scram, Reactor water level continues to drop until it reaches its Level 2 setpoint where the RCIC and HPCI systems initiate to maintain Reactor water level. The RCIC System automatically shuts down when Reactor Vessel inventory reaches the Level 8 high level setpoint.

The RCIC Pumps have a minimum flow requirement of 616 gpm. This includes a required flow of 600 gpm to the Reactor Vessel, which is sufficient to prevent the water level from decreasing to the point where the core would be uncovered during an isolation event without the use of the ECCS. An additional 16 gpm must be supplied to the RCIC lube oil cooler. The RCIC System is capable of providing design flow within 55 seconds upon receipt of a start signal. The RCIC System is normally supplied from the non-safety Condensate Storage Tank; its secondary and safety related source is from the Suppression Pool.

The RCIC System is classified as Safety Class 2, Seismic Category I. The system is capable of initiation and operation independent of ac power.

Test Requirement(s):

Quarterly Pump testing

References:

1. LGS Technical Specification Tables 3.3.2-2 and 3.3.5-2
2. LGS Technical Specification 3/4.7.3
3. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
6. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
7. UFSAR Chapter 15, Accident Analysis
8. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
9. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051
10. ECR LG 95-01651

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Turbine Exhaust Line Vacuum Breakers

ID Nos.: 49-1017, 49-1018, 49-1F068, 49-1F081
49-2017, 49-2018, 49-2F068, 49-2F081

P&ID/COORD (respectively): M-49 (SHT 1) / A-8 (Unit 1)
M-49 (SHT 2) / A-8 (Unit 2)

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 3.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety OC Failsafe -

Test Frequency (Direction): ET-Q(F&R) **Appendix J, Type C:** N

VRR/VCS/ROJ: GVRR-5

Remarks: Relief request GVRR-5 allows these series-parallel check valves to be tested as a unit, rather than individually. The basis for use of this test method is described in NUREG-1482, Section 4.1.1.

Safety Function(s): The RCIC turbine exhaust line vacuum breakers perform an active safety function in both the open and closed positions.

These valves open to prevent siphoning of water from the Suppression Pool into the RCIC turbine exhaust line caused by the condensation of steam following system isolation. This is accomplished by admitting air from the containment free space to the turbine exhaust line when negative pressure within the line reaches a point where the vacuum breakers open. The vacuum breakers are designed to open with a pressure differential of < 0.5 psid across the seat. Failure of these valves to open could cause a pressure spike in the turbine exhaust piping upon system restart, resulting in a turbine trip and rendering the system inoperable.

In the closed position, these valves prevent the diversion of unquenched RCIC turbine exhaust steam into the Suppression Chamber atmosphere. Quenching of the exhaust steam by directing it below the surface of the Suppression Pool is necessary to limit the increase in Suppression Pool temperature and pressure in the Suppression Chamber. Failure of these valves to close could result in an increase in Suppression Chamber pressure or pool temperature to the point of exceeding Technical Specification limits or containment vessel design limits.

Test Requirement(s):

Quarterly exercise test to the full open and closed positions.

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
3. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
4. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plant, Section 4.1.1.
5. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: Safeguard Piping Fill Inlet Check Valves

ID Nos.: 49-1032, 49-1033, 49-2032, 49-2033

P&ID/COORD (respectively): M-49 (SHT 1) / C-3, C-3, M-49 (SHT 2) / C-3, C-3

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.50 **Valve Type:** CK **Act. Type:** SA

Positions: Normal C Safety OC Failsafe -

Test Frequency (Direction): ET-Q(F&R) **Appendix J, Type C:** N

VRR/VCS/ROJ: GVRR-4

Remarks: This relief request allows testing of these series check valves in the reverse direction as a unit, rather than individually. The basis for this test method is described in NUREG-1482, Section 4.1.1.

Safety Function(s): The Safeguard Piping Fill System (SPFS) supply check valves to the RCIC system perform active safety functions in the open and closed positions.

These valves must be capable of closure to prevent diversion of RCIC discharge flow to the SPFS, and to provide high to low pressure boundary isolation between the RCIC system and the lower design pressure piping of the safety related SPFS. Failure of these valves to close could compromise the ability of the RCIC system to fulfill its design safety function by allowing loss of RCIC flow through a possibly faulted line instead of flow being directed to the Reactor Vessel. Additionally, failure of these valves to close could render the Safeguard Piping Fill System inoperable due to overpressurization.

These valves also perform an active safety function in the open position. They must be capable of opening to allow flow from the SPFS to maintain the RCIC System piping in a solid state condition when the system is in standby. This is necessary for water hammer protection upon RCIC system initiation, and to support the RCIC system startup injection time requirement by minimizing the lag time between the signal to start the RCIC pump and the initiation of flow to the Reactor Vessel. Failure of these check valves to open could render both the RCIC and Safeguard Piping Fill Systems incapable of fulfilling their design safety functions.

The RCIC system stay fill level is continuously monitored to ensure the system is maintained in a solid state. In the event of a decline in system pressure, an alarm would alert the operator to take action to refill the system. There are no defined flow rate requirements specified for these valves. Since the valves must pass flow to place the RCIC System in a standby condition, demonstration of their ability to establish the RCIC System in a solid state will satisfy their forward flow test requirement.

Test Requirement(s):

Quarterly exercise test to the open and closed positions.

Reference(s):

1. LGS Technical Specification Bases 3/4.7.3
2. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
3. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
4. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
5. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plant, Section 4.1.1.
6. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Turbine Exhaust Line Stop/Check Valve

ID Nos.: 49-1F001, 49-2F001

P&ID/COORD (respectively): M-49 (SHT 1) / B-4, M-49 (SHT 2) / B-4

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 8.00 **Valve Type:** SK **Act. Type:** SA

Positions: Normal OC Safety O Failsafe -

Test Frequency (Direction): ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The RCIC turbine exhaust to Suppression Pool stop-check valves perform an active safety function in the open position. They must be capable of opening to route the maximum expected exhaust steam to the Suppression Pool when the RCIC pump is operating at rated flow of 616 gpm. Failure of these valves to fully open during RCIC turbine/pump operation would create excessive back pressure in the exhaust line resulting in an isolation signal to the RCIC system. The RCIC turbine trips upon receipt of a high turbine exhaust diaphragm pressure of 10.0 psig, thereby preventing the system from performing its design safety function. Additionally, excessive back pressure in the steam exhaust line could result in damage to system components.

The turbine exhaust stop check valve does not perform a safety function in the closed position. The exhaust line does penetrate primary containment; however, containment isolation is provided by the Suppression Pool water seal and a power operated outboard containment isolation valve.

Test Requirement(s):

Quarterly exercise test to the open position.

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.7.3
3. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
6. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
7. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
8. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Pump Suction Supply Check Valves From the CST and Suppression Pool

ID Nos.: 49-1F011, 49-1F030, 49-2F011, 49-2F030

P&ID/COORD (respectively): M-49 (SHT 1) / E-2, A-6, M-49 (SHT 2) / E-2, A-6

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 6.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_O_ Failsafe_-_

Test Frequency (Direction): ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The RCIC pump suction check valves from the CST and the Suppression Pool perform active safety functions in the open position. The RCIC pump suction supply check valve from the CSTs, F011, must open upon RCIC System initiation to provide suction to the pump. This valve must be capable of passing a minimum flow rate of 600 gpm. When the CSTs reach low level, the RCIC pump suction is automatically aligned to the Suppression Pool. The Suppression Pool suction supply check valve, F030, must then be capable of going to the full open position, thereby supplying the required suction to the RCIC pump. The required flow rate through this valve is also 600 gpm. Failure of these valves to go to the full open position could prevent the RCIC system from fulfilling its design safety function.

These check valves do not perform a safety function in the closed position. Motor-operated isolation valves are located upstream of the individual check valves, and are provided with interlocks which prevent both isolation valves from being in the open position simultaneously.

Test Requirement(s):

Quarterly full stroke exercise test to the open position.

Reference(s):

1. LGS Technical Specification Table 3.3.5-2
2. LGS Technical Specification 3/4.7.3
3. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
6. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
7. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
8. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051
9. Control Drawing, M-1-E51-1030-F-008.10

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Pump Discharge Check Valve

ID Nos.: 49-1F014, 49-2F014

P&ID/COORD (respectively): M-49 (SHT 1) / D-3, M-49 (SHT 2) / D-3

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 6.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety O Failsafe -

Test Frequency (Direction): ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The RCIC pump discharge check valve performs an active safety function in the open position. This valve must be capable of opening to provide an injection flow of 600 gpm to the Reactor Vessel, which is sufficient to prevent the water level from decreasing to the point where the core would be uncovered during an isolation event without the use of the ECCS. Therefore, since this check valve is located downstream of the lube oil cooler supply line, it must be capable of passing a minimum of 600 gpm in order to perform its safety function in the open position. Failure of this check valve to fully open could restrict the amount of RCIC flow directed to the Reactor Vessel.

This check valve does not perform a safety function in the closed position. When the RCIC system is in a standby condition the check valve is closed to allow the RCIC pump discharge piping to be maintained in a solid state. Failure of the check valve to properly close would result in a high pump suction pressure alarm in the main control room.

Test Requirement(s):

Quarterly exercise test to the full open position.

Reference(s):

1. LGS Technical Specification 3/4.7.3
2. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
3. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
4. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Pump Minimum Flow Bypass to Suppression Pool

ID Nos.: 49-1F021, 49-2F021

P&ID/COORD (respectively): M-49 (SHT 1) / C-3, M-49 (SHT 2) / C-3

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 2.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety O Failsafe -

Test Frequency (Direction): ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The RCIC pump minimum flow bypass line check valve performs an active safety function in the open position. The valve must be capable of opening to prevent the RCIC pump from being damaged by overheating due to the pump operating in a dead-headed condition. This is accomplished by initially directing pump flow to the Suppression Pool until predetermined flow rates are reached. The minimum flow required to prevent pump overheating when operating in low flow conditions is 75 gpm. Therefore, this check must be able to pass a minimum of 75 gpm in order to perform its safety function.

This check valve does not perform a safety function in the closed position. The minimum flow bypass line penetrates primary containment at Penetration X-216 with no other branch connections downstream of the check valve. The containment isolation provisions for this line consist of a Suppression Pool water seal, an isolation valve outside of containment, and a closed system outside of containment.

Test Requirement(s):

Quarterly exercise test to the full open position.

Reference(s):

1. LGS Technical Specification Tables 3.3.2-2 and 3.3.5-2
2. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
3. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
4. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
5. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Vacuum Pump Discharge Check Valve (PCIV)

ID Nos.: 49-1F028, 49-2F028

P&ID/COORD (respectively): M-49 (SHT 1) / B-2, M-49 (SHT 2) / B-2

Code Class: 2 **Category:** A/C **Active/Passive:** A

Size: 1.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal C Safety C Failsafe -

Test Frequency (Direction): ET-C(R), LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: 49-VCS-3

Remarks: Cold shutdown justification 49-VCS-3 defers reverse exercise testing due to a violation of containment isolation requirements.

Safety Function(s): The RCIC vacuum pump discharge to Suppression Pool check valve performs an active safety function in the closed position. This valve is identified in UFSAR Table 6.2-17 as a containment isolation valve for Penetration X-217. As such, it must be capable of closure to prevent the release of radioactive materials to secondary containment in the event of a loss of pressure boundary of the vacuum pump suction and discharge lines upstream of F028, or when the RCIC System is in an isolated condition.

This valve does not perform a safety function in the open position. The valve opens to allow removal of any noncondensible gas from the barometric condenser in order to allow for efficient condensation of RCIC leakoff steam. The noncondensible gas is exhausted to the suppression pool. Failure of this valve to open would not compromise the ability of the RCIC system to fulfill its safety function.

Test Requirement(s):

Exercise test to the closed position during cold shutdown
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
6. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: Fill From Condensate Transfer to RCIC Pipe

ID Nos.: 49-1F064, 49-1F065, 49-2F064, 49-2F065

P&ID/COORD (respectively): M-49 (SHT 1) / B-4, B-4, M-49 (SHT 2) / B-4, B-4

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 2.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety C Failsafe -

Test Frequency (Direction): ET-C(R) **Appendix J, Type C:** N

VRR/VCS/ROJ: 49-VCS-4, GVRR-4

Remarks: Cold shutdown justification 49-VCS-4 defers testing due to location of valves (i.e. high temperature, high radiation area). Relief request GVRR-4 allows testing of these series check valves as a unit, rather than individually. The basis for this test method is described in NUREG-1482, Section 4.1.1.

Safety Function(s): These series check valves are located in the Condensate Transfer System (CTS) supply line to RCIC pump discharge pipe. They perform an active safety function in the closed position to prevent diversion of RCIC discharge flow to the CTS. They also provide high to low pressure boundary isolation between the Class 2 RCIC System and the lower design pressure non-Code, non-seismic Condensate Transfer System. Failure of these valves to close could compromise the ability of the RCIC system to fulfill its design safety function by allowing loss of RCIC flow through a possibly faulted line instead of flow being directed to the Reactor Vessel.

These valves do not perform a safety function in the open position. During normal plant operation the CTS is used to maintain the ECCS lines full. The non-Code, non-seismic CTS, however, cannot be credited with the capability of fulfilling this safety function and it is therefore assigned to the Safeguards Piping Fill System (SPFS).

Test Requirement(s):

Exercise test to the closed position during cold shutdowns.

Reference(s):

1. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
2. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
3. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plant, Section 4.1.1.
4. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Barometric Condenser Vacuum Pump Discharge PCIV

ID Nos.: HV-49-1F002, HV-49-2F002

P&ID/COORD (respectively): M-49 (SHT 1) / B-5, M-49 (SHT 2) / B-5

Code Class: 2 **Category:** A/C **Active/Passive:** A

Size: 2.00 **Valve Type:** SK **Act. Type:** MO

Positions: Normal_OC_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-Q(R), ST-Q(C) LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally open, motor-operated RCIC barometric condenser vacuum pump discharge PCIV performs an active safety function in the closed position. This valve is identified in UFSAR Table 6.2-17 as a containment isolation valve for Penetration X-217. As such, it must be capable of closure to prevent the release of radioactive materials to secondary containment in the event of a loss of pressure boundary of the vacuum pump suction and discharge lines upstream of F028, or when the RCIC is in an isolated condition. It has a maximum isolation time of 60 seconds. This valve does not receive an automatic isolation signal for containment isolation in order to support RCIC System operation, but may be closed by remote manual switch actuation from the Control Room.

This valve does not perform a safety function in the open position. The valve is normally open to allow removal of any noncondensible gas from the barometric condenser in order to allow for efficient condensation of RCIC leakoff steam. The noncondensible gas is exhausted to the Suppression Pool. Failure of this valve to open would not compromise the ability of the RCIC System to fulfill its safety function. The valve receives its control power from Division I of the Class 1E dc power system, and is capable of operation independent of AC power.

Test Requirement(s):

Quarterly exercise test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.6.3-1
2. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
6. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Main Steam Supply Inboard and Outboard PCIVs

ID Nos.: HV-49-1F007, HV-49-1F008,
HV-49-2F007, HV-49-2F008

P&ID/COORD (respectively): M-49 (SHT 1) / F-6, F-5 M-49 (SHT 2) / F-6, F-5

Code Class: 1 **Category:** A **Active/Passive:** A

Size: 3.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_O_ Safety_OC_ Failsafe_AI_

Test Frequency (Direction): ET-C, ST-C(O&C) (F007), ET-Q, ST-Q(O&C) (F008) LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 49-VCS-1 (F007 Only)

Remarks: Cold shutdown justification 49-VCS-1 allows deferred exercise testing of F007 due to its location inside the drywell, since failure in the closed position would require plant shutdown.

Safety Function(s): These normally open, motor-operated RCIC main steam supply inboard and outboard PCIVs perform active safety functions in both the open and closed positions.

These valves are identified in UFSAR Table 6.2-17 as containment isolation valves for Penetration X-10. As such, they must be capable of closure to provide containment integrity when necessary. However, they do not receive any automatic containment isolation signals in order to assure that the RCIC System will be available if required. Instead, the RCIC System has its own isolation logic, which isolates RCIC in the event of a fault within the system. Initiation of a RCIC isolation signal will occur as a result of the following:

1) Low steam supply pressure
2) RCIC steam line delta pressure high
3) RCIC equipment room temperature high
4) RCIC equipment room delta temperature high

5) RCIC pipe routing area temperature high
6) High turbine exhaust diaphragm pressure

Initiation of any one of these signals could indicate a line break in the RCIC steam supply line. In that case, these valves would perform a containment isolation function by automatically isolating the Reactor Vessel from the faulted line condition.

These normally open valves also perform an active safety function in the open position to provide steam supply to the RCIC turbine. They receive no signals to automatically open. However, they may be required to reopen, by remote manual switch actuation, to re-establish RCIC System operation.

The valves have a maximum isolation time of 7.2 seconds. Control power is provided by separate Class 1E emergency ac buses, thereby ensuring isolation capability.

Test Requirement(s):

Quarterly full stroke exercise test (F008)
Quarterly stroke time test to the open and closed positions (F008)
Full stroke exercise test during cold shutdowns (F007)
Stroke time test to the open and closed positions during cold shutdowns (F007)
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification Table 3.6.3-1
3. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
4. UFSAR Section 6.2.4, Containment Isolation System
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
7. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Pump Suction Supply From the CST Isolation Valves

ID Nos.: HV-49-1F010, HV-49-2F010

P&ID/COORD (respectively): M-49 (SHT 1) / E-2, M-49 (SHT 2) / E-2

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 6.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_O_ Safety_OC_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(O&C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The RCIC pump suction supply isolation valve from the CST performs an active safety function in the open and closed positions.

This normally open, motor-operated valve performs an active safety function in the open position to provide suction to the RCIC pump from its primary source. When in standby, the RCIC System is aligned to this non-safety related supply source. Suppression Pool water may not be of condensate quality, therefore it is preferred that it only be used if sources of condensate quality water are not available. When the RCIC system receives an initiation signal, F010 will automatically open, if closed. This ensures automatic system alignment to the CST. The valve must be capable of opening in sufficient time to support the 55 second system respond time.

This valve performs an active safety function in the closed position to provide separation between the CST and the Suppression Pool. When the CST reaches low level, the RCIC pump is automatically aligned to the Suppression Pool. This is accomplished by the supply isolation valves from the Suppression Pool automatically opening, at which point F010 will automatically close. This sequence ensures the supply source to the RCIC pump is uninterrupted. This valve receives its control power from Division I of the Class 1E dc power system, and is capable of operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.5-2
2. LGS Technical Specification 3/4.7.3
3. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
4. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
5. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
6. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
7. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051
8. Control Drawing, M-1-E51-1030-F-008.10

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Pump Discharge Outboard Isolation Valve

ID Nos.: HV-49-1F012, HV-49-2F012

P&ID/COORD (respectively): M-49 (SHT 1) / D-4, M-49 (SHT 2) / D-4

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 6.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal OC Safety O Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The RCIC pump discharge outboard isolation valve is a normally open, motor-operated valve that performs an active safety function in the open position. When the RCIC receives an initiation signal, F012 will automatically open, if closed. This ensures automatic system alignment to the Reactor Vessel. The valve is designed to open within 15 seconds to support the 55 second system response time.

This valve does not perform a safety function in the closed position. It is installed to provide redundant isolation capability for the RCIC System from the Feedwater injection if downstream isolation valve, F013, is opened for quarterly testing. This isolation capability prevents possible exposure of low pressure RCIC pump suction piping to Feedwater pressure by maintaining a two valve isolation. However, cold shutdown justification 49-VCS-2 allows deferral of testing of F013 due to overpressure concerns through the multiple branch connections. The valve receives its control power from Division I of the Class 1E dc power system, and is capable of initiation and operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.7.3
2. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
3. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
4. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
5. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051
7. Control Drawing, M-1-E51-1030-F-008.10

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Pump Discharge Inboard Isolation Valve - PCIV

ID Nos.: HV-49-1F013, HV-49-2F013

P&ID/COORD (respectively): M-49 (SHT 1) / D-4, M-49 (SHT 2) / D-4

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 6.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal C Safety OC Failsafe AI

Test Frequency (Direction): ET-C, ST-C(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 49-VCS-2

Remarks: This cold shutdown test justification allows deferred exercise testing due to the valves location in the steam tunnel, which is a high temperature/radiation area, and due to MELB/HELB considerations.

Safety Function(s): The RCIC pump discharge inboard isolation valve is a normally closed, motor operated valve that performs an active safety function in the open and closed positions.

This valve is identified in UFSAR Table 6.2-17 as a containment isolation valve for Penetration X-9B. As such, it must be capable of closure to provide containment integrity when necessary. However, it does not receive any automatic containment isolation signal in order to assure that the RCIC System will be available if required. The valve must be capable of automatically closing, however, when steam supply valve F045 closes or when the RCIC turbine trip throttle valve is closed. Steam supply valve F045 will automatically close when a high water level is indicated in the Reactor Vessel, thereby returning the RCIC System to a standby condition.

This valve also performs an active safety function in the open position. It must be capable of automatic actuation to the open position on a RCIC initiation signal for system alignment to the Reactor Vessel. The valve is designed to open within 15 seconds to support the 55 second system response time, and has an assigned closure time of 15 seconds for containment isolation when RCIC is returned to standby.

The valve receives its control power from Division I of the Class 1E dc power system, and is capable of operation independent of AC power.

Test Requirement(s):

Full stroke exercise test during cold shutdown
Stroke time test to the open and closed positions during cold shutdown
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. LGS Technical Specification 3/4.7.3
3. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
6. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
7. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
8. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051
9. Control Drawing, M-1-E51-1030-F-008.10
10. ECR LG 95-01651

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Pump Minimum Flow Isolation Valve - PCIV

ID Nos.: HV-49-1F019, HV-49-2F019

P&ID/COORD (respectively): M-49 (SHT 1) / C-5, M-49 (SHT 2) / C-5

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 2.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal C Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): This normally closed, motor-operated minimum flow isolation valve performs active safety functions in both the open and closed positions.

This valve opens to prevent the pump from overheating by operating in a dead-headed condition for a prolonged period of time. This is accomplished by initially directing pump flow to the Suppression Pool until predetermined flow rates are reached. The valve must be capable of opening to direct flow to the Suppression Pool upon receipt of a RCIC pump low flow signal of < 95 gpm with a RCIC pump discharge pressure > 125 psig. This valve must be capable of opening within 5 seconds.

F019 must be capable of closing when pump discharge flow reaches a predetermined amount (>150 gpm increasing), thereby directing all flow to the Reactor Vessel. Additionally, F019 must be capable of automatic closure whenever the turbine trip throttle valve 1(2)12 is closed or when RCIC steam supply valve, F045, is fully closed. Failure of F019 to close subsequent to a turbine trip signal could result in draining the condensate storage tank to the suppression pool. This valve has a maximum isolation time of 8 second.

Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for this valve. Because the line penetration for this valve is below minimum required Suppression Pool level, a water seal shall be maintained at all times following an accident. Therefore, type C testing is not required.

The valve motor operator is powered from Division I of the Class 1E dc power system to assure valve operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. LGS Technical Specification 3/4.7.3
3. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
6. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
7. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
8. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051
9. Control Drawing, M-1-E51-1030-F-008.10
10 LCR 95-13-0
11. ECR LG 96-00752 Rev. 0
12. ECR LG 95-01651

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Pump Full Flow Test Return to CST Isolation Valves

ID Nos.: HV-49-1F022, HV-49-2F022

P&ID/COORD (respectively): M-49 (SHT 1) / E-4, M-49 (SHT 2) / E-4

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 4.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The RCIC pump full flow test return to CST isolation valve performs an active safety function in the closed position. This normally closed, motor operated valve provides a means of full flow operability testing of the RCIC System without injecting into the Reactor Vessel by allowing recirculation through the CST. The active safety function in the closed position is to isolate the RCIC recirculation test circuit from the RCIC pump discharge to the Reactor Vessel. The valve must be capable of closure upon receipt of a signal indicating the Suppression Pool supply valves, F031 and F029, are fully open; and when discharge isolation valve, F013, is not fully closed. These interlocks ensure the valve will automatically close if a pump test is in progress when a demand start of the RCIC System is required. The valve must be capable of closure within sufficient time to support the system response time of 55 seconds.

These valves do not perform any safety function in the open position. They are open only during RCIC pump operability testing.

This valve receives its control power from Division I of the Class 1E dc power system, and is capable of operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.7.3
2. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
3. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
4. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
5. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051
7. Control Drawing, M-1-E51-1030-F-008.10
8. ECR LG 95-01651

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Steam Drain Line to Condenser Inboard Outboard Isolation Valves

ID Nos.: HV-49-1F025, HV-49-1F026, HV-49-2F025, HV-49-2F026

P&ID/COORD (respectively): M-49 (SHT 1) / C-2, B-2 M-49 (SHT 2) / C-2, B-2

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** AO

Positions: Normal_O_ Safety_C_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C),PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally open, fail-closed, air-operated steam drain isolation valves perform an active safety function in the closed position. During normal plant operation they are maintained in the open position to provide a drainage path for condensation which may have accumulated in the RCIC steam supply line. This condensate collects in the drain pot and is routed back to the Main Condenser. These valves must be capable of automatic closure to provide an isolation between the RCIC steam supply and outside secondary containment. Failure of these valves to close could result in a release of radioactive materials outside secondary containment. They are provided with interlocks to assure their closure for drain line isolation when steam supply valve F045 opens, and when valve F045 closes, these valves open to provide a path for condensate drainage. These valves fail to their closed position on loss of electric power or loss of air. Drain valve, F026, also serves as a Class 2 to non-Code boundary valve.

These steam line drain valves do not perform a safety function in the open position. F025 and F026 prevent water carry-over (water slugs) from the main steam lines condensate in the RCIC steam supply line from entering the RCIC turbine. The steam supply lines are designed such that no pockets exist, thereby assuring that no slugs of water can be trapped in the lines. During RCIC system operation, any condensation is carried with the steam flow and exhausted to the Suppression Pool. Additionally, the Terry Turbines have been designed and tested to ensure that water carry-over will not cause damage to the turbine.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Quarterly fail-safe test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.7.3
2. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
3. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
4. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
5. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Pump Suction From Suppression Pool Isolation Valve F031 (PCIV)

ID Nos.: HV-49-1F029, HV-49-1F031, HV-49-2F029, HV-49-2F031

P&ID/COORD (respectively): M-49 (SHT 1) / A-5, M-49 (SHT 1) / A-6, M-49 (SHT 2) / A-5, M-49 (SHT 2) / A-6

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 6.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal C Safety O (F029) OC (F031) Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C)-(F031), ST-Q(O)-(F029), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These normally closed, motor-operated valves are located in the RCIC Pump suction supply line from the Suppression Pool. All of these valves perform an active safety function in the open position. These valves must be capable of opening when the CST reaches its low level setpoint, in order to realign the RCIC Pump suction to the Suppression Pool.

The inboard isolation valves (F031s) also perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17as containment isolation valves for Penetration X-214. As such, they must be capable of closure to provide containment integrity when necessary. They do not receive any automatic containment isolation signal in order to assure that the RCIC System will be available if required. However, they must be capable of closure by remote manual switch subsequent to a RCIC isolation to protect Suppression Pool inventory. They have a maximum isolation time of 60 seconds.

Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for the F031 valves. Because the line penetration for this valve is below minimum required Suppression Pool level, a water seal is maintained at all times following an accident. Therefore, Type C testing is not required.

The outboard isolation valves (F029s) do not perform any safety function in the closed position. The isolation provisions for this line consist of a Suppression Pool water seal and one isolation valve outside of containment (F031).

Motor operators for all of the valves are powered from Division 1 of the Class 1E dc power system to assure valve operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions (F031)
Quarterly stroke time test to the open position (F029)
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. LGS Technical Specification 3/4.7.3
3. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
6. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
7. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
8. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051
9. LCR 95-13-0
10. ECR LG 95-00753 Rev 0

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Turbine Exhaust Line PCIV

ID Nos.: HV-49-1F060, HV-49-2F060

P&ID/COORD (respectively): M-49 (SHT 1) / C-5, M-49 (SHT 2) / C-5

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 8.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal O Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): The normally open, motor-operated RCIC turbine exhaust to Suppression Pool isolation valve (PCIV) performs an active safety function in the open and closed positions.

This valve must be open in order to allow steam from the RCIC Pump turbine to exhaust to the Suppression Pool. It must be capable of fully opening by remote manual switch, if closed, in order to clear a permissive which allows the RCIC Pump turbine steam supply valve (F045) to open.

This valve is identified in UFSAR Table 6.2-17as a containment isolation valve for Penetration X-215. As such, it must be capable of closure to provide containment integrity when necessary. However, it does not receive any automatic containment isolation signal in order to assure that the RCIC System will be available if required. It has a maximum isolation time of 80 seconds.

Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for this valve. Because the line penetration for this valve is below minimum required suppression pool level, a water seal is maintained at all times following an accident. Therefore, Type C testing is not required.

The valve motor operator is powered from Division 1 of the Class 1E dc power system to assure valve operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. LGS Technical Specification 3/4.7.3
3. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
4. UFSAR Section 6.2.4, Containment Isolation System
5. UFSAR Table 6.2-17, Containment Penetration Data
6. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
7. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
8. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
9. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051
10. LCR 95-13-0
11. ECR LG 96-00752 Rev. 0

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Steam Line Bypass Warmup - PCIV

ID Nos.: HV-49-1F076, HV-49-2F076

P&ID/COORD (respectively): M-49 (SHT 1) / E-5, M-49 (SHT 2) / E-5

Code Class: 1 **Category:** A **Active/Passive:** A

Size: 1.50 **Valve Type:** GL **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally closed, motor-operated RCIC main steam supply line bypass warmup isolation valve performs an active safety function in the closed position. This valve is identified in UFSAR Table 6.2-17as a containment isolation valve for Penetration X-10. As such, it must be capable of closure to provide containment integrity. The valve does not receive an automatic closure signal for containment isolation, but must be capable of automatically closing upon receipt of a RCIC isolation signal, which includes any one of the following:

1) Low steam supply pressure
2) RCIC steam line delta pressure high
3) RCIC equipment room temperature high
4) RCIC equipment room delta temperature high
5) RCIC pipe routing area temperature high
6) High turbine exhaust diaphragm pressure

Initiation of any one of these signals could indicate a line break occurrence in the RCIC steam supply line. In that case, this valve would perform a containment isolation function by automatically isolating the Reactor Vessel from the faulted line condition. This valve has a maximum isolation time of 45 seconds. Its control power is provided by the same Class 1E ac emergency bus as that providing F008.

This valve does not perform a safety function in the open position. Subsequent to extended shutdown periods this valve is placed in the open position to preheat the RCIC steam supply line up to the steam supply valve (F045) prior to opening F008.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
6. UFSAR Section 6.2.4, Containment Isolation System
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
4. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
7. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Turbine Exhaust Line Vacuum Breaker Isolation Valves

ID Nos.: HV-49-1F080, HV-49-1F084
HV-49-2F080, HV-49-2F084

P&ID/COORD (respectively): M-49 (SHT 1) / A-7, C-8, M-49 (SHT 2) / A-7, C-8

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 3.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal O Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The RCIC turbine exhaust line vacuum breaker isolation valves perform an active safety function in both the open and closed positions.

In the open position, these valves prevent siphoning of Suppression Pool water into the turbine exhaust line as a result of the vacuum created by the condensation of steam following RCIC Pump shutdown. This is accomplished by admitting air from the containment free space to the turbine exhaust line when negative pressure within the line reaches a point where the vacuum breakers open. Failure of these valves to open, by remote manual switch, could cause a pressure spike in the turbine exhaust piping upon system restart, resulting in a turbine trip, and rendering the system inoperable.

These valves are identified in UFSAR Table 6.2-17 as containment isolation valves for Penetration X-241. As such, they must be capable of closure to provide containment integrity. These valves close automatically on receipt of a high drywell pressure and low RCIC steam supply pressure signal. Both signals must be present for valve closure. The valves have a maximum isolation time of 40 seconds.

The valves' control power is provided by separate Class 1E ac emergency buses, thereby ensuring isolation capability.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. LGS Technical Specification 3/4.7.3
3. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
4. UFSAR Section 6.2.4, Containment Isolation System
5. UFSAR Table 6.2-17, Containment Penetration Data
6. UFSAR Section 7.1.2.1.17, RCIC System - Instrumentation and Controls
7. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
8. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
9. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: Excess Flow Check Valves for RCIC Pump Turbine Steam Supply PDT-1(2)N057A&C (Hi/Lo) and PT-1(2)N058A,C,E&G - PCIVs

ID Nos.: XV-49-1F044A, XV-49-1F044B, XV-49-1F044C, XV-49-1F044D
XV-49-2F044A, XV-49-2F044B, XV-49-2F044C, XV-49-2F044D

P&ID/COORD (respectively): M-49 (SHT 1) / G-5, E-5, G-5, D-5,
M-49 (SHT 2) / G-5, E-5, G-5, D-5

Code Class: 1 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** XC **Act. Type:** SA

Positions: Normal_O_ Safety_C_ Failsafe_-_

Test Frequency (Direction): ET-R(F), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: GVROJ-2

Remarks: Refueling outage justification GVROJ-2 allows functional testing of excess flow check valves to be performed at refueling.

Safety Function(s): Per Regulatory Guide 1.11 (Safety Guide 11), an excess flow check valve may satisfy the containment isolation criteria of 10CFR50, Appendix A (General Design Criteria 55 and 56). For instrument lines penetrating containment that are part of the protection system, excess flow check valves are acceptable provided the instrument sensing lines are sized or orificed such that in the event of a postulated piping or component failure (1) leakage is reduced to the maximum extent practical consistent with other safety requirements, (2) the rate and extent of coolant loss is within the capability of the reactor coolant makeup system, (3) the integrity and performance of the secondary containment and associated safety systems will be maintained and (4) the potential offsite exposure will be substantially less than 10CFR100 requirements.

These normally open, 1 inch excess flow check valves are located at Penetrations X-33B, and X-40F-1. They have an active safety function to close in order to provide containment isolation and Reactor Coolant pressure boundary (RCPB) integrity subsequent to a loss of the instrument loop. The UFSAR stipulates that instrument lines from the RCPB which penetrate the containment shall conform with Reg. Guide 1.11, which requires that they be equipped with a restricting orifice located inside the drywell, and an EFCV located outside and as close as practicable to the containment. In the event that an instrument line that communicates with the RCPB develops a leak outside the containment, a flow rate that results in a differential pressure across the valve of 3-10 psi causes the EFCV to close automatically. If an EFCV fails to close when required, the main flow path through the valve has a resistance to flow at least equivalent to a .375 inch diameter orifice.

These valves do not require Type C leak rate testing. The line does not isolate during a LOCA, and only leaks if the line or instrument ruptures. Leak tightness of the line is verified during the ILRT (Type A Test).

Test Requirements:

Exercise test in the forward direction during refueling outages.
Position indication verification at least once every 2 years

References:

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.4, Containment Isolation System
3. Regulatory Guide 1.11, Instrument Lines Penetrating Primary Reactor Containment
4. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: Discharge Line Off Barometric Condenser Check Valve

ID Nos.: 50-1F047, 50-2F047

P&ID/COORD (respectively): M-50 (SHT 1) / B-5, M-50 (SHT 2) / B-5

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 2.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety C Failsafe -

Test Frequency (Direction): ET-Q(R) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): This check valve is located in the RCIC Barometric Condenser Condensate Pump discharge return line to the RCIC Pump suction piping, and performs an active safety function in the closed position. It is located downstream of a normally open manual globe valve which serves as a boundary between Seismic Class I and IIA portions of the system. Since this is the only valve capable of automatic closure between the RCIC Pump suction piping and the barometric condenser, it must be capable of closure to prevent diversion of RCIC pump suction to a faulted line during a seismic event. Failure of this valve to close could result in a reduction of the discharge flow of the RCIC Pump and possibly compromise the ability of the RCIC System to perform its design safety function.

This valve does not perform a safety function in the open position. Condensate return to the RCIC pump suction supply from the barometric condenser is not required for the RCIC pump, or supporting components, to perform their safety functions.

Test Requirement(s):

Quarterly exercise test to the closed position

Reference(s):

1. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
2. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
3. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
4. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: Steam Supply to RCIC Turbine - Governing Valve

ID Nos.: FV-050-113, FV-50-213

P&ID/COORD (respectively): M-50 (SHT 1) / F-4, M-50 (SHT 2) / F-4

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 4.00 **Valve Type:** GL **Act. Type:** HYD

Positions: Normal OC Safety O Failsafe O

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks: The governing valve shall be tested as a skid-mounted component. Testing the major component is an acceptable means of verifying the operational readiness of this valve according to NUREG-1482, Section 3.4.

Safety Function(s): This normally open, hydraulically-actuated valve performs an active safety function in the open position. The valve is hydraulically closed using oil pressure from the lube oil system, and is opened by spring pressure. On a loss of oil, or control signal, the valve will fail to its open position. The safety function in the open position is to regulate the steam flow to the turbine to control the speed, and therefore, the flow rate at which makeup water is injected to the reactor vessel.

This valve does not perform an active safety function in the closed position. The governing valve is open when the RCIC turbine is at rest and receives no closure signals subsequent to RCIC initiation. The primary means of steam supply isolation when the turbine is in a standby condition is provided by the steam supply isolation valve, F045.

Test Requirement(s):

No testing requirements

Reference(s):

1. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
2. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
3. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 3.4.
4. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Turbine Trip Throttle Valve

ID Nos.: HV-050-112, HV-50-212

P&ID/COORD (respectively): M-50 (SHT 1) / F-3, M-50 (SHT 2) / F-3

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 4.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_OC_ Safety_O_ Failsafe_-_

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks: The trip throttle valve shall be tested as a skid-mounted component. Testing the major component is an acceptable means of verifying the operational readiness of this valve according to NUREG-1482, Section 3.4.

Safety Function(s): This normally open valve performs an active safety function in the open position to admit steam to the RCIC Pump turbine. The trip throttle valve is held open by a mechanical latching mechanism against spring pressure. The operational function of HV-1(2)12 is to act as an emergency turbine stop valve, tripping closed on receipt of a turbine trip signal. The trip throttle valve will close immediately by spring pressure to shut off the steam to the turbine. The latching mechanism requires resetting prior to reopening the valve after automatic valve closure.

This valve does not perform a safety function in the closed position. HV-1(2)12 is identified as performing the function of emergency shutdown for the RCIC Pump turbine. All RCIC isolation signals, and manual or overspeed trip signals, energize a trip solenoid or trip mechanical overspeed trip mechanism which allows spring tension to close the valve and block the admission of steam to the turbine. However, the safety related isolation features of this valve for steam supply line break are performed by F007 and F008 which are tested to assure their isolation capability.

Test Requirement(s):

No testing requirements

Reference(s):

1. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
2. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
3. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 3.4.
4. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Barometric Condenser Drain Isolation Valves to Radwaste

ID Nos.: HV-50-1F004, HV-50-1F005, HV-50-2F004, HV-50-2F005

P&ID/COORD (respectively): M-50 (SHT 1) / B-5, A-5, M-50 (SHT 2) / B-5, A-5

Code Class: 2 **Category:** N/A **Active/Passive:** N/A

Size: 1.00 **Valve Type:** GL **Act. Type:** AO

Positions: Normal OC Safety N/A Failsafe C

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These air-operated RCIC Barometric Condenser drain isolation valves do not perform a safety function in the open or closed positions. When the RCIC System is in standby, these valves are opened as necessary to maintain level in the Barometric Condenser by routing excess condensate to the Dirty Radwaste System. F005 opens when RCIC Pump turbine steam supply valve F045 closes; F004 opens when the Barometric Condenser Vacuum Tank level exceeds its setpoint, if F045 is closed. The barometric condenser, however, is not required for RCIC System operation.

When the RCIC System receives an auto-initiation signal, these valves automatically close, blocking the flow path to the Dirty Radwaste System. Condensate is then directed to the RCIC Pump suction piping via the Condensate Pump. However, failure of these valves to close would not compromise the safety function of the RCIC system. Any leakage of radioactive steam would be contained in the pump room enclosure or directed to Dirty Radwaste. In either instance, there is no potential for a leakage path outside secondary containment. Verification of automatic closure for these valves is performed during the quarterly RCIC Pump test.

Test Requirement(s):

No testing requirements

Reference(s):

1. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
2. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
3. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
4. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Turbine Steam Supply Isolation Valves

ID Nos.: HV-50-1F045, HV-50-2F045

P&ID/COORD (respectively): M-50 (SHT 1) / F-2, M-50 (SHT 2) / F-2

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 6.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal C Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C) PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): This normally closed, motor operated steam supply valve performs an active safety function in the open and closed positions.

This valve must be capable of opening upon receipt of a RCIC system actuation signal of reactor low water level-Level 2 when steam exhaust isolation valve, F060, is fully open to provide steam to the RCIC Pump turbine. The valve must open within 15 seconds to ensure the RCIC system can attain its design flow rate within 55 seconds of receipt of an initiation signal.

This valve must be capable of automatic closure when reactor vessel inventory reaches Level 8 high level in order to prevent carryover of reactor inventory from reaching the RCIC Pump turbine, which could result in damage to the turbine.

The valve motor operator is powered from Division I of the Class 1E dc power system to assure valve operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.7.3
2. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
3. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
4. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051
6. ECR LG 95-01651

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Lube Oil Cooler Supply Isolation Valves

ID Nos.: HV-50-1F046, HV-50-2F046

P&ID/COORD (respectively): M-50 (SHT 1) / D-7, M-50 (SHT 2) / D-7

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 2.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_C_ Safety_OC_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(O&C) PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): This normally closed motor-operated valve performs an active safety function in the open and closed positions.

In the open position, this valve provides cooling water to the RCIC Lube Oil Cooler. Cooling water flow to the Lube Oil Cooler is necessary to support RCIC Pump/Turbine operation. The valve must be capable of opening upon receipt of a RCIC System actuation signal of reactor low water level-Level 2.

This valve must also be capable of automatic closure on Reactor Vessel high level and of remote manual closure subsequent to a RCIC isolation signal unassociated with Vessel level when placing the RCIC system in standby to isolate the CST from the Radwaste System. Isolation of the CST is necessary to prevent CST inventory from draining to the RCIC Barometric Condenser which would subsequently be directed to Dirty Radwaste via the RCIC Vacuum Tank Condensate Pump.

The valve motor operator is powered from Division I of the Class 1E dc power system to assure valve operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.7.3
2. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
3. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
4. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Pump to Lube Oil Cooler Pressure Control Valve

ID Nos.: PCV-050-1F015, PCV-50-2F015

P&ID/COORD (respectively): M-50 (SHT 1) / C-7, M-50 (SHT 2) / C-7

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** SA

Positions: Normal O Safety TH Failsafe AI

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These self-contained pressure-regulating valves regulate cooling water pressure to the RCIC Lube Oil Coolers at 65 psia to provide a flow of approximately 16 gpm at rated conditions, thereby maintaining lube oil temperature out of the main bearings at less than 160 °F. The valves are set to continuously regulate pressure. In the event the valve fails to regulate the pressure at the required value, system design prevents overpressurization of the lube oil cooler by means of a restricting orifice downstream of the valve in addition to a downstream relief valve. This valve is exempt from Code requirements on the basis that it is a pressure regulating valve without a failsafe position.

Test Requirement(s):

No testing requirements

Reference(s):

1. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
2. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
3. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 4.2.9.
4. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Turbine Exhaust Line Rupture Disk

ID Nos.: PSE-50-1D001, PSE-50-1D002,
PSE-50-2D001, PSE-50-2D002

P&ID/COORD (respectively): M-50 (SHT 1) / F-5, H-5, M-50 (SHT 2) / F-5, H-5

Code Class: 2 **Category:** D **Active/Passive:** A

Size: 8.00 **Valve Type:** RD **Act. Type:** SA

Positions: Normal_C_ Safety_O_ Failsafe_-_

Test Frequency (Direction): RD-P2 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks: Rupture disks require replacement every five years per Code.

Safety Function(s): The turbine exhaust rupture disks perform an active safety function by providing overpressure protection to the RCIC turbine. The rupture disks have a burst pressure of 150 psig ± 10 psig and function as a pressure relief in the event of high turbine exhaust pressure due to a blocked exhaust line. Both disks must burst if pressure transmitters, PIS-N655A&E and PIS-N655C&G, fail to perform their function to trip the turbine by automatically closing the steam line isolation valves, F007 and/or F008. Failure of these rupture disks to burst could result in exceeding the pressure rating of the turbine exhaust piping.

Test Requirement(s):

Rupture disk test per Code requirements

Reference(s):

1. LGS Technical Specification 3/4.7.3
2. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
3. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
4. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Turbine Lube Oil Filter Bypass Relief Valve

ID Nos.: PSV-50-125, PSV-50-225

P&ID/COORD (respectively): M-50 (SHT. 3) / E-8, M-50 (SHT. 4) / E-8

Code Class: N/A **Category:** N/A **Active/Passive:** N/A

Size: 0.75 **Valve Type:** RL **Act. Type:** SA

Positions: Normal C Safety N/A Failsafe -

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These non-safety related relief valves are located in the RCIC Turbine lube oil system and function as pressure-regulating valves in the event that the lube oil filter becomes clogged during operation. They lift at their set pressure to allow lube oil to bypass the filters. The lube oil filters are duplex type and are provided with pressure indication on the inlet and outlet sides and with a high differential pressure alarm. Lube oil temperature indication is also provided at several points in the system. Indication of a problem would allow the operator ample time to shift and clean the affected filter.

Test Requirement(s):

No testing requirements.

Reference(s):

1. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
2. UFSAR Section 7.4.1.1, RCIC System - Instrumentation and Controls
3. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System

System (No): Reactor Core Isolation Cooling (RCIC) System (49 & 50)

Component Description: RCIC Lube Oil Cooler relief Valve

ID Nos.: PSV-50-1F018, PSV-50-2F018

P&ID/COORD (respectively): M-50 (SHT 1) / C-6, M-50 (SHT 2) / C-6

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** RL **Act. Type:** SA

Positions: Normal C Safety OC Failsafe -

Test Frequency (Direction): RT-P3 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): This cooling water supply relief valve to the RCIC lube oil cooler performs an active safety function by providing overpressure protection to the RCIC lube oil cooler tubes and cooling water supply piping. It is located downstream of pressure control valve PCV-F015. This relief valve has a set point which provides adequate assurance of overpressure protection to the associated piping, and components, in the event that PCV-F015 fails to properly control pressure at the required 60 psig.

Test Requirement(s):

Relief valve test once every 10 years

Reference(s):

1. LGS Technical Specification 3/4.7.3
2. UFSAR Section 5.4.6, Reactor Core Isolation Cooling System
3. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
4. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97051

RESIDUAL HEAT REMOVAL (RHR) SYSTEM

System (No): Residual Heat Removal (RHR) System (51)

Component Description: Residual Heat Removal (RHR) Pumps

ID Nos.: 1AP202, 1BP202, 1CP202, 1DP202,
2AP202, 2BP202, 2CP202, 2DP202

P&ID/COORD (respectively):

M-51 (SHT 1) / B-4,	M-51 (SHT 3) / B-5,
M-51 (SHT 1) / B-3,	M-51 (SHT 3) / B-6,
M-51 (SHT 5) / B-4,	M-51 (SHT 7) / B-5,
M-51 (SHT 5) / B-3,	M-51 (SHT 7) / B-6

Pump Type: Centrifugal **Test Parameters:** D/P, Q, V

Relief Request: GPRR-2

Remarks: Relief request GPRR-2 allows the exemption of instrument accuracy requirements as specified in the Code.

Safety Function(s): The Residual Heat Removal (RHR) Pumps are required to operate in support of the following modes of RHR System operation:

1) Low Pressure Coolant Injection (LPCI)
2) Suppression Pool Cooling (SPC)
3) Containment (Drywell) Spray
4) Suppression Chamber Spray
5) Shutdown Cooling (SDC)

In the LPCI mode, the RHR Pumps have an active safety function to provide adequate core flooding during an accident, up to the worst case design basis LOCA. The LPCI portion of the RHR System operates in conjunction with the other Emergency Core Cooling Systems (ECCS) to restore and maintain the coolant inventory in the Reactor Vessel at an adequate level for core cooling. The LPCI System is comprised of four loops, each with one pump. The RHR/LPCI Pumps provide water to the Reactor Vessel upon receipt of a Reactor low water level - Level 1 or high drywell pressure actuation signal coincident with a low Reactor pressure signal, when Reactor pressure has decreased to below the shutoff head of the RHR Pumps. Each LPCI pump must be capable of delivering 10,000 gpm. The RHR Pumps are normally in standby and aligned for the LPCI mode of operation. If offsite ac power is available, the C and D RHR pumps start immediately, taking suction from the Suppression Pool. RHR pumps A and B start after a 5 second time delay to limit the loading of the power sources. If offsite power is lost, each pump starts as soon as its standby power source becomes available. Three RHR/LPCI Pumps are required to operate during the first 10 minutes of a design basis LOCA, at which point, 2 pump operation will accomplish accident mitigation and safe shutdown. The pumps can also be started remotely by switches in the Control Room.

In the Suppression Pool Cooling (SPC) mode, the RHR Pumps have an active safety function to circulate water from the Suppression Pool through the RHR Heat Exchangers in order to remove heat from the Suppression Pool to maintain the Suppression Pool temperature and Containment pressure within required limits. This is accomplished by transferring heat to the RHRSW System. The Suppression Pool Cooling mode of RHR is required following actuation of the Main Steam Safety/Relief Valves (SRVs) and may also be used to control Suppression Pool temperature during normal and various emergency situations. This mode of RHR is initiated by remote manual actuation from the Control Room.

In the Containment Spray and Suppression Chamber Spray modes, the RHR Pumps circulate Suppression Pool water through the RHR Heat Exchangers and return it to the containment via the wetwell and drywell spargers and spray nozzles. The function of these modes of RHR operation is to cool the containment and control pressure by cooling hot non-condensible gases and condensing steam in the drywell and wetwell. This reduces the internal pressure and temperature of the containment, and maintains the Suppression Chamber temperature within design limits, following a design basis LOCA. These modes of RHR are initiated by remote manual actuation from the Control Room.

In the Shutdown Cooling (SDC) mode of RHR, the RHR Pumps circulate water from the Reactor Vessel through the RHR Heat Exchangers and back to the Reactor. This is the primary and normally the only method used to achieve and maintain cold shutdown. Since the normal Shutdown Cooling mode of RHR is not required to operate following an accident, a single suction line with two in-series valves is provided to assure containment isolation capability in the event of an accident. In the event that one of these valves fails to open during a normal shutdown, attempts are made to manually open or isolate and repair the affected valve. If this is not successful, alternate shutdown cooling flow paths may be established to place the Reactor in a cold shutdown condition. One alignment utilizes a Core Spray (CS) Pump to circulate water from the Suppression Pool through the Reactor Vessel. The water from the Vessel overflows into an open Main Steam SRV and discharges back to the Suppression Pool. The RHR System is placed in the Suppression Pool Cooling mode to support this method of shutdown cooling. If CS is not available, the RHR system, operating in the LPCI mode with the flow diverted through an RHR Heat Exchanger, can be utilized.

Each RHR pump motor is supplied from a separate Class 1E emergency ac bus. Control power for RHR Pumps A through D is from the corresponding Class 1E 125 V dc buses A through D.

Test Requirement(s):

Quarterly pump testing

References:

1. LGS Technical Specification Table 3.2.2-2
2. LGS Technical Specification 3/4.4.9
3. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
4. LGS Technical Specification 3/4.6.2
5. UFSAR Section 5.2.2, Overpressure Protection
6. UFSAR Section 5.4.7, Residual Heat Removal System
7. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
8. UFSAR Section 7.3, Engineered Safety Feature Systems
9. UFSAR Section 7.4, Instrumentation and Controls
10. UFSAR Chapter 15, Accident Analysis
11. Design Baseline Document L-S-09, Residual Heat Removal System
12. Design Baseline Document L-S-42, Nuclear Boiler System
13. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: Condensate Fill for RHR Injection Line Check Valves

ID Nos.: 51-1032A, 51-1032B, 51-2032A, 51-2032B,
51-1F090A, 51-1F090B, 51-1F090C, 51-1F090D,
51-2F090A, 51-2F090B, 51-2F090C, 51-2F090D

P&ID/COORD (respectively): M-51 (SHT 1) / G-5, M-51 (SHT 3) / G-4,
M-51 (SHT 5) / G-5, M-51 (SHT 7) / G-4,
M-51 (SHT 1) / G-4, M-51 (SHT 3) / G-4,
M-51 (SHT 1) / G-5, M-51 (SHT 3) / G-4,
M-51 (SHT 5) / G-4, M-51 (SHT 7) / G-4,
M-51 (SHT 5) / G-5, M-51 (SHT 7) / G-4

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 4.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety C Failsafe -

Test Frequency (Direction): DI-P6, PT-DI @ **Appendix J, Type C:** N

VRR/VCS/ROJ: GVROJ-1

Remarks: Refueling outage justification GVROJ-1 documents operability verification of these check valves by sample disassembly and inspection per GL 89-04 Position 2.

Safety Function(s): These downstream, in-series check valves are located in keepfill injection lines to the RHR System. They have an active safety function in the closed position to prevent diversion of RHR injection flow to the non-safety related, non-seismic Condensate Transfer System. The capability of these valves to fulfill their required function is confirmed by sample disassembly and inspection as documented in GVROJ-1. Disassembly and inspection is recognized as a positive means of verifying individual valve operability per NRC Generic Letter 89-04, Position 2. Therefore, since these valves have no safety function to open and only one valve in each pair is required to be capable of closure, and since no safety analysis requires a two valve configuration for this application, only these valves are included in the IST Program. The upstream valves are considered to have no safety design basis, thus no safety function, and are therefore outside the scope of the Program.

The valves do not perform a safety function in the open position. During normal plant operation, they are open to allow the Condensate Transfer System to maintain ECCS injection lines full in order to minimize system response times and water hammer potential. Although this function is essential for maintaining the ECCS in a standby condition, the ASME Safety Class 2 Safeguard Piping Fill System is credited with performing this function.

Test Requirement(s):

Verification of valve operability to the closed position by sample disassembly during refueling outages or associated system outages.

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. UFSAR Section 5.4.7, Residual Heat Removal System
3. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
4. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
5. UFSAR Section 7.3, Engineered Safety Feature Systems
6. UFSAR Chapter 15, Accident Analysis
7. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 4.1.1
8. NRC Generic Letter (GL) 89-04, Supplement 1, Guide on Developing Acceptable Inservice Testing Programs
9. Design Baseline Document L-S-09, Residual Heat Removal System
10. ECR LG 95-00862 Rev. 0

System (No): Residual Heat Removal (RHR) System (51)

Component Description: Safeguard Piping Fill to RHR Injection Line Check Valves

ID Nos.: 51-1115A, 51-1115B, 51-1115C, 51-1115D,
51-1116A, 51-1116B, 51-1116C, 51-1116D,
51-2115A, 51-2115B, 51-2115C, 51-2115D,
51-2116A, 51-2116B, 51-2116C, 51-2116D

P&ID/COORD (respectively): M-51 (SHT 1) / A-7, M-51 (SHT 3) / A-2,
M-51 (SHT 1) / A-6, M-51 (SHT 3) / A-3,
M-51 (SHT 1) / A-7, M-51 (SHT 3) / A-2,
M-51 (SHT 1) / A-6, M-51 (SHT 3) / A-3,
M-51 (SHT 5) / A-7, M-51 (SHT 7) / A-2,
M-51 (SHT 5) / A-6, M-51 (SHT 7) / A-3,
M-51 (SHT 5) / A-7, M-51 (SHT 7) / A-2,
M-51 (SHT 5) / A-6, M-51 (SHT 7) / A-3

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.50 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_C_ Safety_C_ Failsafe_-_

Test Frequency (Direction): ET-Q(R) (A and C valves) **Appendix J, Type C:** N
DI-P6, PT-DI@ (B and D valves)

VRR/VCS/ROJ: GVRR-4 (A and C valves)
GVROJ-1 (B and D valves)

Remarks: Relief request GVRR-4 allows testing of these series check valves in the reverse direction as a unit, as described in NUREG 1482, Section 4.1.1. Refueling outage justification GVROJ-1 documents operability verification of these check valves by sample disassembly and inspection per GL 89-04 Position 2.

Safety Function(s): The safeguard piping fill supply to RHR system check valves perform an active safety function in the closed position. They must be capable of closure to prevent diversion of RHR discharge flow to the safeguard piping fill system, and to provide high to low pressure boundary isolation between the RHR system and the lower design pressure piping of the safety related safeguard piping fill system. Failure of these valves to close could compromise the ability of the RHR system to fulfill its design safety function by allowing loss of RHR flow through a possibly faulted line. Additionally, failure for these valves to close could render the safeguard piping fill system inoperable due to overpressurization.

These valves do not perform a safety function in the open position. The RHR system is analyzed to be placed in operation once during post-LOCA conditions. System restart capability is beyond design basis. Therefore, the ability for the stayfill check valves to open, subsequent to system initiation for reestablishment of a solid discharge piping condition, is not a safety function. Subsequent to quarterly pump testing the system is placed in standby with discharge piping in a solid condition. Piping level is continuously monitored to ensure the system is maintained in a solid state. Should a decline in discharge piping level occur, an alarm would initiate operator action to refill the system. Reestablishing the system to a standby condition subsequent to testing is accomplished by the condensate system and is not a safety related function.

Test Requirement(s):

Exercise test in the reverse direction as a unit quarterly (A and C valves)
Verification of valve operability by sample disassembly and inspection during refueling outages or associated system outages (B and D valves)

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. UFSAR Section 5.4.7, Residual Heat Removal System
3. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
4. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
5. UFSAR Section 7.3, Engineered Safety Feature Systems
6. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 4.1.1
7. NRC Generic Letter (GL) 89-04, Supplement 1, Guide on Developing Acceptable Inservice Testing Programs
8. Design Baseline Document L-S-09, Residual Heat Removal System
9. GE SIL No. 375, Power Supply for Discharge Fill Systems on BWR/4,5 & 6.
10. Engineering Work Request (EWR) L-00364
11. ECR LG 95-00862 Rev. 0

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pump Discharge Check Valve

ID Nos.: 51-1F031A, 51-1F031B, 51-1F031C, 51-1F031D,
51-2F031A, 51-2F031B, 51-2F031C, 51-2F031D

P&ID/COORD (respectively): M-51 (SHT 1) / B-6, M-51 (SHT 3) / C-3,
M-51 (SHT 1) / B-6, M-51 (SHT 3) / B-4,
M-51 (SHT 5) / B-6, M-51 (SHT 7) / C-3,
M-51 (SHT 5) / B-6, M-51 (SHT 7) / B-4

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 18.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety O Failsafe -

Test Frequency (Direction): ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The RHR pump discharge check valves perform an active safety function in the open position. The valves must be capable of opening to allow passage of system flow upon RHR/LPCI pump initiation. The LPCI rated flow of 10,000 gpm is the necessary flow rate required by the ECCS analysis conducted at 20 psid between the reactor vessel and primary containment for each loop. Therefore, each check valve must be capable of passing at least 10,000 gpm to perform its safety function.

These check valves do not perform a safety function in the closed position. The discharge lines of the RHR pumps do not interface, thus there is no possibility of discharge flow from an inservice pump being diverted through an idle pump. Additionally, the RHR system is analyzed to be placed in operation only once during post-LOCA conditions. System restart capability during accident conditions is beyond design basis. Therefore, the ability for the pump discharge check valves to close, subsequent to system initiation for reestablishment of a solid discharge piping condition, is not a safety function. Subsequent to quarterly pump testing the system is placed in standby with discharge piping in a solid condition. Piping level is continuously monitored to ensure the system is maintained in a solid state. Should a decline in discharge piping level occur, an alarm would initiate operator action to refill the system. Reestablishing the system to a standby condition subsequent to testing is not a safety related function.

Test Requirement(s):

Quarterly exercise test in the forward direction.

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. UFSAR Section 5.4.7, Residual Heat Removal System
3. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
4. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
5. UFSAR Section 7.3, Engineered Safety Feature Systems
6. UFSAR Section 15.0, Accident Analysis
7. Design Baseline Document L-S-09, Residual Heat Removal System
8. GE SIL No. 375, Power Supply for Discharge Fill Systems on BWR/4,5 & 6.
9. Engineering Work Request (EWR) L-00364
10. A/R Number A0724761

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pump Minimum Flow Check Valve

ID Nos.: 51-1F046A, 51-1F046B, 51-1F046C, 51-1F046D,
51-2F046A, 51-2F046B, 51-2F046C, 51-2F046D

P&ID/COORD (respectively): M-51 (SHT 1) / C-5, M-51 (SHT 3) / D-5,
M-51 (SHT 1) / C-5, M-51 (SHT 3) / D-4,
M-51 (SHT 5) / C-5, M-51 (SHT 7) / C-5,
M-51 (SHT 5) / C-5, M-51 (SHT 7) / C-4

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 4.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety O Failsafe -

Test Frequency (Direction): ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These RHR pump minimum flow check valves perform an active safety function in the open position to allow sufficient flow to pass through the min-flow recirc line to protect the RHR pump from overheating when operating under low flow or shutoff head conditions. Subsequent to a pump start the minimum flow power operated valve, F007, receives an open signal if a flow rate of 1500 gpm is not achieved after a 10 second time delay. These valves must pass a minimum of 1000 gpm to perform their safety function in the open position.

These check valves do not perform a safety function in the closed position. The valves are located in lines which penetrate primary containment. However, these lines terminate below minimum Suppression Pool water level. The isolation provisions for this line consist of a Suppression Pool water seal and one isolation valve outside of containment.

Requirement(s):

Quarterly exercise test to the open position.

Reference(s):

1. UFSAR Section 5.4.7, Residual Heat Removal System
2. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
3. UFSAR Section 7.3, Engineered Safety Feature Systems
4. Design Baseline Document L-S-09, Residual Heat Removal System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: LPCI Injection Manual Isolation Valve

ID Nos.: 51-1F065A, 51-1F065B, 51-1F065C, 51-1F065D, 51-2F065A, 51-2F065B, 51-2F065C, 51-2F065D

P&ID/COORD (respectively): M-51 (SHT 1) / F-1, M-51 (SHT 1) / F-1, M-51 (SHT 5) / F-1, M-51 (SHT 5) / F-1, M-51 (SHT 3) / F-8, M-51 (SHT 3) / G-8, M-51 (SHT 7) / F-8, M-51 (SHT 7) / G-8

Code Class: 1 **Category:** B **Active/Passive:** P

Size: 12.00 **Valve Type:** GT **Act. Type:** MA

Positions: Normal LO Safety O Failsafe -

Test Frequency (Direction): PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally locked open manual maintenance isolation valves are located in each LPCI injection line to the Reactor Vessel. They have a passive safety function in the open position to allow LPCI flow to the Reactor Vessel in the event of a LOCA. These valves are equipped with position indication lights in the Control Room so that the position can be verified remotely.

These Category B valves have no safety function in the closed position. They are normally locked open, and they are closed only to perform maintenance or leak rate testing on the LPCI injection check valves. Testing and maintenance are performed when the RHR/LPCI system is not required to be operable.

Requirement(s):

Position indication verification at least once every 2 years.

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. UFSAR Section 5.4.7, Residual Heat Removal System
3. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
4. Design Baseline Document L-S-09, Residual Heat Removal System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pumps C and D Shutdown Cooling Suction Valves

ID Nos.: 51-1F067A, 51-1F067B, 51-2F067A, 51-2F067B

P&ID: M-51 (SHT 1) / B-2, M-51 (SHT 3) / B-7, M-51 (SHT 5) / B-2, M-51 (SHT 7) / B-7

Code Class: 2 **Category:** N/A **Active/Passive:** N/A

Size: 20.00 **Valve Type:** GT **Act. Type:** MA

Positions: Normal LC Safety N/A Failsafe -

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These locked-closed, manual valves do not perform any safety function in the open or closed positions. They have been installed to provide operational flexibility and convenience when the Plant is shut down for maintenance.

Under various conditions in OpCon 4 (Cold Shutdown) and 5 (Refueling), Technical Specifications require two RHR Shutdown Cooling subsystems and two LPCI subsystems to be operable. Depending on the selected alignment, the remote potential exists to inadvertently pump water from the Suppression Pool into the Reactor Vessel via the operating Shutdown Cooling Pump, or to drain the Reactor Vessel to the Suppression Pool via the Shutdown Cooling suction line if the pumps are idle. Although these conditions are undesirable and could adversely impact component or personnel safety, their prevention is not a required safety function. Furthermore, strict administrative controls and interlocks between the Shutdown Cooling suction and Suppression Pool suction valves result in such an occurrence being extremely unlikely.

These valves do not perform a safety function in the open position. Per UFSAR paragraph 5.4.7.1.1.1b, the plant can be shut down using the capacity of a single RHR heat exchanger. Maintaining two subsystems (A and B) operable provides the required level of independence and redundancy to assure that the plant can be shut down. UFSAR Section 5.4.7.1.5 states that the reactor coolant can be brought to 212°F in less than 20 hours with only one heat exchanger loop in operation and that the ability to use the C and D RHR Pumps in the shutdown cooling mode is provided to enhance maintenance flexibility. DBD L-S-09 states that operation of RHR Pumps 1(2)C-P202 and 1(2)D-P202 in the SDC mode is not required to meet any licensing or safety design inputs and is intended to allow operational flexibility.

Test Requirement(s):

No testing requirements.

Reference(s):

1. UFSAR Section 5.4.7, Residual Heat Removal System
2. Design Baseline Document L-S-09, Residual Heat Removal System

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pumps C & D Minimum Flow Bypass PCIV

ID Nos.: HV-51-105A, HV-51-105B, HV-51-205A, HV-51-205B

P&ID/COORD (respectively): M-51 (SHT 1) / C-3, M-51 (SHT 3) / D-6, M-51 (SHT 5) / C-3, M-51 (SHT 7) / D-6

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 4.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal O Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These motor-operated minimum flow isolation valves perform an active safety function in the closed position and a passive safety function in the open position.

These valves are normally keylocked in the open position and perform a passive safety function in the open position to prevent RHR Pumps C and D from being damaged by overheating due to the pump operating in a dead-headed condition. This is accomplished by initially directing pump flow to the Suppression Pool. When a predetermined flow rate is reached, minimum flow isolation valve, F007, automatically closes, directing full flow to the Reactor Vessel. These valves do not receive any automatic isolation signals, and are identified in UFSAR Table 6.2-17 as having a safe shutdown and post accident position of open. If closed for containment isolation, these valves would not be required to be reopened for accident mitigation.

These valves are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetrations X-226A & B. As such, they perform an active safety function in the closed position to maintain containment integrity and must be capable of closure by remote manual switch. They have a maximum design isolation time of 40 seconds.

Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for these valves. Because the line penetration is below minimum required Suppression Pool level, a water seal is maintained at all times following an accident. Therefore, Type C testing is not required.

The valve motor operators are powered from Class 1E ac emergency buses to ensure closure capability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. 10CFR50, Appendix J, Paragraph III.C.3.
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 5.4.7, Residual Heat Removal System
5 UFSAR Section 6.2.3.2.3.1, Water Seals
6. UFSAR Section 6.2.4, Containment Isolation System
7. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
8. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
9. Design Baseline Document L-S-09, Residual Heat Removal System
10. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052
11. LCR 95-13-0
12. ECR 96-00752 Rev. 0

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pumps Full Flow Test Return, Minimum Flow and Suppression Pool Cooling PCIV

ID Nos.: HV-51-125A, HV-51-125B, HV-51-225A, HV-51-225B

P&ID/COORD (respectively): M-51 (SHT 1) / D-3, M-51 (SHT 3) / D-6, M-51 (SHT 5) / D-3, M-51 (SHT 7) / D-6

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 18.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_O_ Safety_OC_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(O&C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These motor operated full flow test return isolation valves perform safety functions in the open and closed positions.

These valves are normally keylocked open and perform a passive safety function in the open position to prevent RHR Pumps A and B from being damaged by overheating due to the pump operating in a dead-headed condition. This is accomplished by initially directing pump flow to the Suppression Pool via the min-flow recirc line. When a predetermined flow rate is reached, minimum flow isolation valve, F007, automatically closes, directing full flow to the Reactor Vessel.

These valves also perform an active safety function in the open position. In the event that they are closed for containment isolation, they may be required to be reopened to establish a flow path for Suppression Pool cooling or shutdown cooling. This flow path for shutdown cooling would be required when RHR is used in conjunction with the CS System for long term shutdown cooling capability. These valves do not receive any automatic actuation signals and must remain operable during accident conditions.

These valves are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetrations X-204A & B. As such, they perform an active safety function in the closed position to maintain containment integrity, and must be capable of closure by remote manual switch. They have a maximum design isolation time of 180 seconds.

Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for these valves. Because the line penetration for this valve is below minimum required Suppression Pool level, a water seal is maintained at all times following an accident. Therefore, Type C testing is not required.

The valve motor operators are powered from Class 1E ac emergency buses to ensure actuation capability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. 10CFR50, Appendix J, Paragraph III.C.3.
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 5.4.7, Residual Heat Removal System
5 UFSAR Section 6.2.3.2.3.1, Water Seals
6. UFSAR Section 6.2.4, Containment Isolation System
7. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
8. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
9. Design Baseline Document L-S-09, Residual Heat Removal System
10. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052
11. LCR 95-13-0
12. ECR 96-00752 Rev. 0

System (No): Residual Heat Removal (RHR) System (51)

Component Description: LPCI Injection Header to Reactor Vessel PCIV

ID Nos.: HV-51-142A, HV-51-142B, HV-51-142C, HV-51-142D
HV-51-242A, HV-51-242B, HV-51-242C, HV-51-242D

P&ID/COORD (respectively): M-51 (SHT 1) / F-2, M-51 (SHT 3) / F-7,
M-51 (SHT 1) / F-2, M-51 (SHT 3) / F-7,
M-51 (SHT 5) / F-2, M-51 (SHT 7) / F-7,
M-51 (SHT 5) / F-2, M-51 (SHT 7) / F-7

Code Class: 1 **Category:** A **Active/Passive:** P

Size: 1.00 **Valve Type:** GL **Act. Type:** AO

Positions: Normal C Safety C Failsafe C

Test Frequency (Direction): LJ-B, LP-T, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed, air-operated isolation valves are located in the pressure equalizing lines around the LPCI injection testable check valves (F041s). They perform passive safety functions in the closed position. They are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetrations X-45A,B,C, & D, and in T.S. Table 3.4.3.2-1 as Reactor Coolant pressure boundary isolation valves. As such, they perform passive safety functions in the closed position to maintain containment integrity, and to provide high to low pressure boundary isolation between the Reactor Coolant and RHR Systems. They require seat leakage testing for verification of leak tight integrity as both PCIVs and PIVs. They have a maximum isolation time of 7 seconds. However, since they are not required to change position to accomplish their required functions, they do not require exercise testing.. These normally closed valves are maintained in the closed position during all modes of plant operation when containment integrity is required and receive no automatic actuation signals.

These valves can be opened to allow pressure equalization across the disk of the testable injection check valves in order to perform periodic testing of the check valves using their air operators. However, as documented in cold shutdown justificaton 51-VCS-1, exercising the testable check valves during power operation would compromise the two valve isolation barrier between the RHR System and the Reactor Coolant System. The pressure equalizing valve is not required to open for LPCI injection. Therefore, these valves do not perform a safety function in the open position.

Test Requirement(s):

Position indication verification once every two years
Seat leakage rate test once every two years (for RCPBIV function)
Seat leakage rate test per 10 CFR 50, Appendix J (Option B) (for PCIV function)

Reference(s):

1. LGS Technical Specification Table 3.4.3.2-1
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 5.4.7, Residual Heat Removal System
4. UFSAR Section 6.2.4, Containment Isolation System
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
7. Design Baseline Document L-S-09, Residual Heat Removal System

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Shutdown Cooling Injection Header Inlet PCIV

ID Nos.: HV-51-151A, HV-51-151B, HV-51-251A, HV-51-251B

P&ID/COORD (respectively): M-51 (SHT 1) / E-3, M-51 (SHT 3) / E-6, M-51 (SHT 5) / E-3, M-51 (SHT 7) / E-6

Code Class: 1 **Category:** A **Active/Passive:** P

Size: 1.50 **Valve Type:** GL **Act. Type:** AO

Positions: Normal_C_ Safety_C_ Failsafe_C_

Test Frequency (Direction): LJ-B, LP-T, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed, air-operated isolation valves are located in the pressure equalizing lines around the shutdown cooling return testable check valves (F050s). They perform passive safety functions in the closed position. They are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetrations X-13A & B, and in T.S. Table 3.4.3.2-1 as Reactor Coolant pressure boundary isolation valves. As such, they perform passive safety functions in the closed position to maintain containment integrity, and to provide high to low pressure boundary isolation between the Reactor Coolant and RHR Systems. They require seat leakage testing for verification of leak tight integrity as both PCIVs and RCPBIVs. They have a maximum isolation time of 20 seconds. However, since they are not required to change position to accomplish their required functions, they do not require exercise testing. These normally closed valves are maintained in the closed position during all modes of plant operation when containment integrity is required. In addition, they receive a Group IIA isolation signal for automatic closure.

These valves can be opened to allow pressure equalization across the disk of the testable injection check valves in order to perform periodic testing of the check valves using their air operators. However, as documented in cold shutdown justificaton 51-VCS-1, exercising the testable check valves during power operation would compromise the two valve isolation barrier between the RHR System and the Reactor Coolant System. The pressure equalizing valve is not required to open to place or maintain the Reactor in the cold shutdown condition nor to mitigate the consequences of any accident. Therefore, these valves do not perform a safety function in the open position.

Test Requirement(s):

Position indication verification once every two years
Seat leakage rate test once every two years (for RCPBIV function)
Seat leakage rate test per 10 CFR 50, Appendix J (Option B) (for PCIV function)

Reference(s):

1. LGS Technical Specification Table 3.4.3.2-1
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 5.4.7, Residual Heat Removal System
4. UFSAR Section 6.2.4, Containment Isolation System
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
7. Design Baseline Document L-S-09, Residual Heat Removal System

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pumps C and D Shutdown Cooling Intertie Valves

ID Nos.: HV-51-182A, HV-51-182B, HV-51-282A, HV-51-282B

P&ID: M-51 (SHT 1) / C-7, M-51 (SHT 3) / C-3, M-51 (SHT 5) / C-7, M-51 (SHT 7) / C-3

Code Class: 2 **Category:** B **Active/Passive:** P

Size: 22.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal LC Safety C Failsafe -

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These valves perform a passive safety function in the closed position. LGS Technical Specifications require these valves to be closed with power removed in order to maintain separation and redundancy whenever the associated LPCI subsystem(s) are required to be operable.

These valves do not perform any safety function in the open position. They may be opened, following restoration of power to their motor-operators, to align the 'C' RHR Pump with the 'A' RHR Heat Exchanger or the 'D' RHR Pump with the 'B' RHR Heat Exchanger for the Shutdown Cooling, Suppression Pool Cooling or Alternate Decay Heat Removal modes of RHR System operation. However, DBD L-S-09 states in several places that operation of RHR Pumps 1(2)C-P202 and 1(2)D-P202 in these modes is not required to meet any licensing or safety design inputs and is intended to allow operational flexibility. During normal operation the 'C' and 'D' loops of RHR are required to be in standby condition for the LPCI mode.

Remote position indication is not available for these valves while they are in their passive safety-related position. Therefore, position indication verification testing is not required.

Test Requirement(s):

No testing requirements.

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. UFSAR Section 5.4.7, Residual Heat Removal System
3. Design Baseline Document L-S-09, Residual Heat Removal System

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Heat Exchanger Shell Side Outlet Isolation Valve

ID Nos.: HV-51-1F003A, HV-51-1F003B, HV-51-2F003A, HV-51-2F003B

P&ID/COORD (respectively): M-51 (SHT 2) / F-5, M-51 (SHT 4) / F-6, M-51 (SHT 6) / F-5, M-51 (SHT 8) / F-6

Code Class: 2 **Category:** B **Active/Passive:** P

Size: 18.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_O_ Safety_O_ Failsafe_AI_

Test Frequency (Direction): PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally open valves are located in the shell side outlet piping from the RHR Heat Exchangers. They perform a passive safety function in the open position to allow return flow to the Suppression Pool during the Suppression Pool Cooling and Containment Spray Cooling modes of RHR System operation. They are also required to be open to place and maintain the Reactor in the cold shutdown condition when using the Shutdown Cooling mode of RHR. They are normally keylocked in the open position and receive no automatic actuation signals.

These valves have no safety function in the closed position. They are not required to change position to support the safety related functions of the RHR system. They would only be closed when their respective RHR Heat Exchanger is out of service for maintenance and is not required to be operable.

Test Requirement(s):

Position indication verification once every two years

Reference(s):

1. UFSAR Section 5.4.7, Residual Heat Removal System
2. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
3. Design Baseline Document L-S-09, Residual Heat Removal System

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pumps A and B Suction Supply from Suppression Pool PCIV

ID Nos.: HV-51-1F004A, HV-51-1F004B, HV-51-2F004A, HV-51-2F004B

P&ID/COORD (respectively): M-51 (SHT 1) / C-3, M-51 (SHT 3) / C-6, M-51 (SHT 5) / C-3, M-51 (SHT 7) / C-6

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 24.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal O Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), PI-T **Appendix J,TypeC:**N

VRR/VCS/ROJ: N/A

Safety Function(s): These normally open suction supply valves have an active safety function in the open position to provide suction from the Suppression Pool to RHR Pumps A and B whenever the system is required to operate in the LPCI, Containment Spray Cooling or Suppression Pool Cooling modes. The valves are interlocked with the associated pump start/trip permissive circuit to ensure a suction flow path is available. The associated pump will trip if these valves are not fully open during automatic initiation of the LPCI mode. They must be capable of opening by remote manual switch actuation, if closed, in the event of a LPCI initiation. These valves do not receive any automatic isolation signals, and are identified in UFSAR Table 6.2-17 as having a safe shutdown and post accident position of open.

These valves must be closed in order to align the RHR System in the Shutdown Cooling mode to place and maintain the Reactor in the cold shutdown condition. Interlocks are provided to prevent the opening of shutdown cooling supply valves, F006A/B, unless F004A/B are fully closed.

These valves are identified in UFSAR Table 6.2-17 as containment isolation valves for Penetrations X-203A and X-203B. As such, they must be capable of closure following an accident to maintain containment integrity. They have a maximum isolation time of 240 seconds.

Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for these valves. Because the line penetration is below minimum required Suppression Pool level, a water seal is maintained at all times following an accident. Therefore, Type C testing is not required.

The valve motor operators are powered from Class 1E ac emergency buses to ensure valve operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. 10CFR50, Appendix J, Paragraph III.C.3.
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 5.4.7, Residual Heat Removal System
5 UFSAR Section 6.2.3.2.3.1, Water Seals
6. UFSAR Section 6.2.4, Containment Isolation System
7. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
8. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
9. Design Baseline Document L-S-09, Residual Heat Removal System
10. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052
11. LCR 95-13-0
12. ECR 96-00752 Rev. 0

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pumps C and D Suction Supply from Suppression Pool PCIV

ID Nos.: HV-51-1F004C, HV-51-1F004D, HV-51-2F004C, HV-51-2F004D

P&ID/COORD (respectively): M-51 (SHT 1) / C-2, M-51 (SHT 3) / C-7, M-51 (SHT 5) / C-2, M-51 (SHT 7) / C-7

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 24.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_O_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These normally open valves have an active safety function in the closed position, and a passive safety function in the open position.

These valves are keylocked open and perform a passive safety function in the open position to provide suction from the Suppression Pool to the RHR C and D Pumps in the event of a LPCI initiation, or if the RHR C and D pumps are chosen as alternatives to the A and B Pumps for placing the RHR System in the Containment Spray Cooling or Suppression Pool Cooling modes of operation. They are interlocked with the associated pump start/trip permissive circuit to ensure a suction flow path is available. The associated pump will trip if these valves are not fully open during automatic initiation of the LPCI mode.

These valves are identified in UFSAR Table 6.2-17as primary containment isolation valves for Penetrations X-203C & D. As such, they perform an active safety function in the closed position to maintain containment integrity and must be capable of closure by remote manual switch. They receive no automatic actuation signals. These valves may also be required to close in the event of a break in the system, or to provide long term leakage control. They have a maximum isolation time of 240 seconds. In the event that these valves were required to close, repositioning to the open position would not be necessary.

These valves would need to be closed in the event that the C or D Pumps were optionally selected for the Shutdown Cooling mode of RHR. However, the RHR A and B loops, along with other alternative safety-related shutdown cooling flowpaths, provide sufficient redundancy such that no credit is taken for the C and D Pumps being necessary to place or maintain the Reactor in the cold shutdown condition.

Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for these valves. Because the line penetration is below minimum required suppression pool level, a water seal is maintained at all times following an accident. Therefore, Type C testing is not required.

The valve motor operators are powered from Class 1E ac emergency buses to ensure valve operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the close position
Position indication verification once every two years

Reference(s):

1. 10CFR50, Appendix J, Paragraph III.C.3.
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 5.4.7, Residual Heat Removal System
5 UFSAR Section 6.2.3.2.3.1, Water Seals
6. UFSAR Section 6.2.4, Containment Isolation System
7. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
8. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
9. Design Baseline Document L-S-09, Residual Heat Removal System
10. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052
11. LCR 95-13-0
12. ECR 96-00752 Rev. 0

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pumps A and B Shutdown Cooling Suction Intertie Valve

ID Nos.: HV-51-1F006A, HV-51-1F006B, HV-51-2F006A, HV-51-2F006B

P&ID/COORD (respectively): M-51 (SHT 1) / B-3, M-51 (SHT 3) / B-7, M-51 (SHT 5) / B-3, M-51 (SHT 7) / B-7

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 20.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally keylocked-closed valves have an active safety function in the closed position. They must be capable of closing, if open, to ensure flow is directed to the Reactor Vessel if a LPCI initiation occurs when the system is operating in the Shutdown Cooling mode. Additionally, if open, their closure would be required to support the Containment Spray Cooling or Suppression Pool Cooling modes of RHR System operation. These valves are interlocked to prevent them from opening unless Suppression Pool suction valves, F004A&B, containment spray valves, F027A&B, and Suppression Pool cooling/test return valves, F024A&B are fully closed. Likewise, Suppression Pool suction supply valves F004A&B will not open unless these valves are fully closed. These valves operate by remote manual switch actuation from the control room and receive no automatic actuation signals.

These valves are opened to provide a flow path to RHR Pumps A and B from the Reactor Recirculation System whenever the system is operating in the Shutdown Cooling mode. The Shutdown Cooling mode of RHR is the primary method for placing and maintaining the Reactor in the cold shutdown condition during normal, as well as most abnormal and emergency, shutdown situations.

The valve motor operators are powered from Class 1E ac emergency buses to ensure valve operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. UFSAR Section 5.4.7, Residual Heat Removal System
3. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
4. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
5. UFSAR Section 6.3.3, ECCS Performance Evaluation
6. Design Baseline Document L-S-09, Residual Heat Removal System
7. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pump Minimum Flow Valve

ID Nos.: HV-51-1F007A, HV-51-1F007B, HV-51-1F007C, HV-51-1F007D, HV-51-2F007A, HV-51-2F007B, HV-51-2F007C, HV-51-2F007D

P&ID/COORD (respectively): M-51 (SHT 1) / C-5, M-51 (SHT 1) / C-5, M-51 (SHT 5) / C-5, M-51 (SHT 5) / C-5, M-51 (SHT 3) / C-5, M-51 (SHT 3) / C-4, M-51 (SHT 7) / C-5, M-51 (SHT 7) / C-4

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 4.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal OC Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The RHR Pump minimum flow valves perform an active safety function in the open and closed positions.

These valves must be capable of opening to provide a recirculation flow path to the Suppression Pool when the pump is operating in a low flow or shutoff head condition. They receive an open signal if a flow rate of 1500 gpm is not achieved after a 10 second time delay following start of their associated RHR Pump in order to prevent pump damage due to overheating.

These valves also perform an active safety function in the closed position. They must be capable of automatic closure when flow in the injection line increases to an amount greater than 1500 gpm in order to direct full LPCI flow to the Reactor Vessel.

The valve motor operators are powered from Class 1E ac emergency buses to ensure valve operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. UFSAR Section 5.4.7, Residual Heat Removal System
2. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
3. UFSAR Section 7.3, Engineered Safety Feature Systems
4. Design Baseline Document L-S-09, Residual Heat Removal System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pumps A and B Shutdown Cooling Suction Supply Valve (Inboard/Outboard PCIVs)

ID Nos.: HV-51-1F008, HV-51-1F009, HV-51-2F008, HV-51-2F009

P&ID/COORD (respectively): M-51 (SHT 1) / E-3, M-51 (SHT 3) / E-8, M-51 (SHT 5) / E-3, M-51 (SHT 7) / E-8

Code Class: 1 **Category:** A **Active/Passive:** A

Size: 20.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-C, ST-C(C), LJ-B, LP-T, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 51-VCS-2

Remarks: Cold shutdown test justification 51-VCS-2 allows deferral of valve exercise testing when reactor coolant system pressure is > 75 psig.

Safety Function(s): These normally keylocked-closed valves have active safety functions in the closed position. They are identified in UFSAR Tables 6.2-17 & 6.2-25 as primary containment isolation valves for Penetration X-12, and in T.S. Table 3.4.3.2-1 as Reactor Coolant pressure boundary isolation valves. As such, they are required to maintain containment integrity and to provide a high to low pressure isolation boundary between the Reactor Recirc System and RHR suction piping. The valves require seat leakage testing for verification of leak tight integrity as both PCIVs and PIVs. They receive an automatic closure signal on low reactor level-Level 3 or high reactor pressure. These valves have a maximum isolation time of 100 seconds.

These valves are opened to provide a suction flow path to the selected RHR Pump(s) from the Reactor Recirc System when the system is operating in the Shutdown Cooling mode. The Shutdown Cooling mode of RHR is the primary method for placing and maintaining the Reactor in the cold shutdown condition during normal, as well as most abnormal and emergency, shutdown situations. These valves are interlocked to prevent them from opening if Reactor Coolant system pressure is > 75 psig.

These valves are located in-series in the only line providing suction to the RHR Pumps for the Shutdown Cooling mode. UFSAR Section 5.4.7.1.5 states that if either of the two shutdown supply valves fails to operate, the design basis states that an operator is sent to open the valve by hand. If this is not feasible, the shutdown line is isolated using manual valve F077 and repairs are made to the shutdown valves so that they can be opened. Residual heat is absorbed by the Main Condenser or by the Suppression Pool with pool cooling by the RHR system while repairs are in process. Another safety-related alternate shutdown cooling flowpath involves injecting water from the Suppression Pool into the Reactor Vessel via a Core Spray Pump, overflowing the Vessel back to the Suppression Pool via an open Main Steam Safety/Relief Valve, and cooling the Suppression Pool using the Suppression Pool Cooling mode of RHR.

The valve motor operators are powered from Class 1E ac emergency buses to ensure valve operability during a loss of offsite power.

Test Requirement(s):

Full stroke exercise test during cold shutdown
Stroke time test to the closed position during cold shutdown
Position indication verification once every two years
Seat leakage rate test once every two years (for RCPBIV function)
Seat leakage rate test per 10 CFR 50, Appendix J (Option B) (for PCIV function)

Reference(s):

1. LGS Technical Specification Table 3.4.3.2-1
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 5.4.7, Residual Heat Removal System
5. UFSAR Section 6.2.4, Containment Isolation System
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
8. UFSAR Section 6.3.3, ECCS Performance Evaluation
9. Design Baseline Document L-S-09, Residual Heat Removal System
10. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pumps C and D test Return Valves

ID Nos.: HV-51-1F010A, HV-51-1F010B, HV-51-2F010A, HV-51-2F010B

P&ID/COORD (respectively): M-51 (SHT 1) / D-6, M-51 (SHT 3) / D-4, M-51 (SHT 5) / D-6, M-51 (SHT 7) / D-4

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 18.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These motor-operated full-flow test return isolation valves perform an active safety function in the closed position. They are opened during RHR Pumps C and D full flow testing and must be capable of automatically closing if a LPCI initiation signal occurs. They will automatically close as a result of Reactor Vessel water level low - Level 1 or high drywell pressure coincident with Reactor low pressure in order to ensure full LPCI flow to the Reactor Vessel. Also, these valves cannot be opened if a LPCI initiation signal is present.

These valves do not perform a safety function in the open position. The RHR system permits periodic testing of the performance characteristics of the RHR pumps to enhance reliability of the system and to demonstrate the capability of the system to perform when required. The full flow test path does not accomplish a safety function and is not required for safe shutdown or accident mitigation.

The valve motor operators are powered from Class 1E ac emergency buses to ensure actuation capability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. UFSAR Section 5.4.7, Residual Heat Removal System
2. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
3. Design Baseline Document L-S-09, Residual Heat Removal System
4. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Heat Exchanger RHRSW Inlet Valve

ID Nos.: HV-51-1F014A, HV-51-1F014B, HV-51-2F014A, HV-51-2F014B

P&ID/COORD (respectively): M-51 (SHT 2) / B-7, M-51 (SHT 4) / C-5, M-51 (SHT 6) / B-7, M-51 (SHT 8) / C-5

Code Class: 3 **Category:** B **Active/Passive:** A

Size: 20.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal OC Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed, motor operated valves are located in the RHRSW supply lines to the tube side of the RHR Heat Exchangers. They perform an active safety function in the open and closed positions.

These valves must be capable of opening by remote manual switch actuation to allow RHRSW flow through the RHR Heat Exchanger when the RHR system is operating in the Suppression Pool Cooling, Containment Spray Cooling, or Shutdown Cooling modes of operation.

These valves also perform an active safety function in the closed position. They must be capable of closure by remote manual switch actuation upon loss of their associated RHR Heat Exchanger to ensure adequate RHRSW flow is provided to the alternate Heat Exchanger. The valves also receive an automatic closure signal upon receipt of a high radiation level signal detected at the RHRSW discharge from the respective RHR heat exchanger. However, this function has been determined not to be safety related as any leakage would be contained in a closed loop with the spray pond.

The valve motor operators are powered by the Class 1E ac emergency bus to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. UFSAR Section 6.2.2, Containment Heat Removal System
2. UFSAR Section 9.2.3, RHR Service Water System
3. NRC Letter, August 7, 1987, RHRSW Process Radiation Monitors, TAC # 65866
4. Design Baseline Document L-S-04, Residual Heat Removal Service Water System
5. Design Baseline Document L-S-09, Residual Heat Removal System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pumps A and B Shutdown Cooling Injection Valve (Outboard PCIVs)

ID Nos.: HV-51-1F015A, HV-51-1F015B, HV-51-2F015A, HV-51-2F015B

P&ID/COORD (respectively): M-51 (SHT 1) / E-3, M-51 (SHT 3) / F-6, M-51 (SHT 5) / E-3, M-51 (SHT 7) / F-6

Code Class: 1 **Category:** A **Active/Passive:** A

Size: 12.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-C, ST-C(C), LJ-B, LP-T, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 51-VCS-1

Remarks: Cold shutdown justification 51-VCS-1 allows deferral of exercise testing due to the potential of overpressurizing the low-pressure rated RHR System piping if these valves were opened during normal operation.

Safety Function(s): These normally closed shutdown cooling return valves have an active safety function in the closed position. They must be capable of closing, if open, to ensure LPCI flow is directed to the Reactor Vessel if a LPCI initiation occurs, or to support the Containment Spray Cooling or Suppression Pool Cooling modes of RHR System operation. In addition, these valves are identified in UFSAR Tables 6.2-17 & 6.2-25 as primary containment isolation valves for Penetrations X-13A&B, and in T.S. Table 3.4.3.2-1 as Reactor Coolant pressure boundary isolation valves. As such, they are required to maintain containment integrity and to provide high to low pressure boundary isolation between the Reactor Recirc and RHR Systems. They must be capable of automatic closure upon receipt of a Group IIA containment isolation signal. They require seat leakage testing for verification of leak tight integrity as both PCIVs and PIVs, and have a maximum isolation time of 45 seconds.

These valves are opened to provide a return flow path from RHR Pumps A and B to Reactor Recirc piping whenever the RHR System is operated in the Shutdown Cooling mode. The Shutdown Cooling mode of RHR is the primary method for placing and maintaining the Reactor in the cold shutdown condition during normal, as well as most abnormal and emergency, shutdown situations. They are interlocked to prevent them from opening if Reactor Coolant System pressure is > 75 psig.

The valve motor operators are powered from Class 1E ac emergency buses to ensure valve operability during a loss of offsite power.

Test Requirement(s):

Full stroke exercise test during cold shutdown
Stroke time test to the closed position during cold shutdown
Position indication verification once every two years
Seat leakage rate test once every two years (for RCPBIV function)
Seat leakage rate test per 10 CFR 50, Appendix J (Option B) (for PCIV function)

Reference(s):

1. LGS Technical Specification Table 3.4.3.2-1
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 5.4.7, Residual Heat Removal System
5. UFSAR Section 6.2.4, Containment Isolation System
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
8. UFSAR Section 6.3.3, ECCS Performance Evaluation
9. Design Baseline Document L-S-09, Residual Heat Removal System
10. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR A and B Containment Spray Line Outboard/Inboard PCIVs

ID Nos.: HV-51-1F016A, HV-51-1F016B, HV-51-1F021A, HV-51-1F021B
HV-51-2F016A, HV-51-2F016B, HV-51-2F021A, HV-51-2F021B

P&ID/COORD (respectively): M-51 (SHT 1) / G-7, M-51 (SHT 3) / G-3,
M-51 (SHT 1) / G-3, M-51 (SHT 3) / G-6,
M-51 (SHT 5) / G-7, M-51 (SHT 7) / G-3,
M-51 (SHT 5) / G-3, M-51 (SHT 7) / G-6

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 16.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal C Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed primary containment isolation valves have active safety functions in the open and closed positions.

These valves must be capable of opening to place the RHR System in the Containment Spray Cooling mode in order to provide containment cooling and pressure reduction in the Drywell following a LOCA. The Containment Spray mode of RHR requires manual initiation from the Control Room. These valves can be opened simultaneously only if high drywell pressure and LPCI initiation on Vessel low water level-Level 1 signals are present and the associated LPCI injection valve (F017A or B) has been closed. These valves do not receive any automatic actuation signals in either the open or closed positions.

These valves are identified in UFSAR Tables 6.2-17 & 6.2-25 as primary containment isolation valves for Penetrations X-39A&B. As such, the valves perform an active safety function in the closed position to maintain containment integrity. They have a maximum isolation time of 160 seconds. They also perform a safety function in the closed position to prevent diversion of LPCI injection flow.

The valve motor operators are powered from separate Class 1E ac emergency buses to ensure isolation capability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.3-2
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 5.4.7, Residual Heat Removal System
5. UFSAR Section 6.2.4, Containment Isolation System
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
8. UFSAR Section 7.3.1.1.4.5, RHR-CSM Initiating Circuits
9. Design Baseline Document L-S-09, Residual Heat Removal System
10. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR LPCI Injection Outboard PCIVs

ID Nos.: HV-51-1F017A, HV-51-1F017B, HV-51-1F017C, HV-51-1F017D, HV-51-2F017A, HV-51-2F017B, HV-51-2F017C, HV-51-2F017D

P&ID/COORD (respectively): M-51 (SHT 1) / F-3, M-51 (SHT 1) / F-3, M-51 (SHT 5) / F-3, M-51 (SHT 5) / F-3, M-51 (SHT 3) / F-6, M-51 (SHT 3) / G-6, M-51 (SHT 7) / F-6, M-51 (SHT 7) / G-6

Code Class: 1 **Category:** A **Active/Passive:** A

Size: 12.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_C_ Safety_OC_ Failsafe_AI_

Test Frequency (Direction): ET-C, ST-C(O&C), LJ-B, LP-T, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 51-VCS-1

Remarks: Cold shutdown justification 51-VCS-1 allows deferral of exercise testing due to the potential of overpressurizing the low-pressure rated RHR System piping if these valves were opened during normal operation.

Safety Function(s): These normally closed RHR/LPCI outboard injection isolation valves perform active safety functions in the open and closed positions.

These valves must be capable of opening to allow LPCI injection flow into the Reactor Vessel. They open automatically on receipt of a LPCI initiation signal on high drywell pressure coincident with reactor low pressure, and Vessel low water level-Level 1 with a Reactor Vessel low pressure permissive.

These valves are identified in UFSAR Tables 6.2-17 & 6.2-25 as primary containment isolation valves for Penetrations X-45A,B,C&D, and in T.S. Table 3.4.3.2-1 as Reactor Coolant pressure boundary isolation valves. As such, they perform active safety functions in the closed position to maintain containment integrity, and to provide high to low pressure isolation between the Reactor Coolant and RHR Systems. These valves require seat leakage testing for verification of leak tight integrity as both PCIVs and

RCPBIVs. Additionally, F017A&B must be capable of closing, if open, to allow initiation of the Containment Spray Cooling, Suppression Pool Cooling, or Shutdown Cooling modes. These valves have a maximum isolation time of 38 seconds.

The valve motor operators are powered from separate Class 1E ac emergency buses to ensure valve operability during a loss of offsite power.

Test Requirement(s):

Full stroke exercise test during cold shutdown
Stroke time test to the open and closed position during cold shutdown
Position indication verification once every two years
Seat leakage rate test once every two years (for RCPBIV function)
Seat leakage rate test per 10 CFR 50, Appendix J (Option B) (for PCIV function)

Reference(s):

1. LGS Technical Specification Table 3.3.3-2
2. LGS Technical Specification Table 3.4.3.2-1
3. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
4. LGS Technical Specification 3/4.6.3
5. UFSAR Section 5.4.7, Residual Heat Removal System
6. UFSAR Section 6.2.4, Containment Isolation System
7. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
8. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
9. UFSAR Section 7.3.1.1.1.4, LPCI mode of RHR System - Instrumentation and Controls
10. Design Baseline Document L-S-09, Residual Heat Removal System
11. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pumps A and B Full Flow Test Return/Suppression Pool Cooling

ID Nos.: HV-51-1F024A, HV-51-1F024B, HV-51-2F024A, HV-51-2F024B

P&ID/COORD (respectively): M-51 (SHT 1) / D-4, M-51 (SHT 3) / D-5, M-51 (SHT 5) / D-4, M-51 (SHT 7) / D-5

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 18.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal OC Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These motor-operated valves perform active safety functions in the open and closed positions.

These normally closed valves perform an active safety function in the open/throttled position to provide a return flow path to the Suppression Pool when RHR loops A or B are operating in the Suppression Pool Cooling mode. They can be opened only when the associated LPCI injection valve (F017A or B) is fully closed. The SPC mode of operation requires manual initiation.

These valves also perform an active safety function in the closed position to prevent diversion of LPCI injection or Shutdown Cooling flow. These valves are opened for periodic pump testing and must be capable of automatic closure upon receipt of a LPCI initiation signal on high drywell pressure coincident with low Reactor pressure, and vessel low water level-Level 1.

The valve motor operators are powered from Class 1E ac emergency buses to ensure actuation capability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. UFSAR Section 5.4.7, Residual Heat Removal System
3. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
4. UFSAR Section 7.3.1.1.1, ECCS - Instrumentation and Controls
5. Design Baseline Document L-S-09, Residual Heat Removal System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Loops A and B Suppression Pool Spray Line Valves PCIV

ID Nos.: HV-51-1F027A, HV-51-1F027B, HV-51-2F027A, HV-51-2F027B

P&ID/COORD (respectively): M-51 (SHT 1) / D-3, M-51 (SHT 3) / E-6, M-51 (SHT 5) / D-3, M-51 (SHT 7) / E-6

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 6.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal C Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally closed, motor-operated Suppression Pool spray line isolation valves perform active safety functions in the open and closed positions.

These valves must be capable of opening by remote manual switch actuation to allow flow to the Suppression Pool spray header for cooling and pressure reduction of the Suppression Pool freespace following a LOCA. Suppression Pool spray is manually initiated from the control room. A manual override circuit will allow the valves to be opened when a LPCI initiation signal is present, but only if the associated LPCI injection isolation valve (F017Aor B) is closed. These valves can be opened or closed manually, at any time, when there is no LPCI initiation signal present. They do not receive an automatic open signal.

These valves also perform active safety functions in the closed position. They are required to close automatically on receipt of a LPCI initiation signal in order prevent LPCI flow from being directed to the Suppression Pool spray header. They are also required to be closed when in the Shutdown Cooling mode to prevent diversion of Reactor Coolant and drainage of the Vessel to the Suppression Pool. Additionally, these valves are identified in UFSAR Tables 6.2-17 & 6.2-25 as primary containment isolation valves for

Penetrations X-205A&B. As such, they must be capable of closure, by remote manual switch actuation, to maintain containment integrity. They have a maximum isolation time of 45 seconds.

The valve motor operators are powered from Class 1E ac emergency buses to ensure valve operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years
Seat leakage rate test per 19 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 5.4.7, Residual Heat Removal System
4. UFSAR Section 6.2.4, Containment Isolation System
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
7. UFSAR Section 7.3.1.1.1.4, LPCI mode of RHR System - Instrumentation and Controls
8. UFSAR Section 7.3.1.1.4, RHR Containment Spray Mode - Instrumentation and Controls
9. Design Baseline Document L-S-09, Residual Heat Removal System
10. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Loop A Discharge to Radwaste Inboard/Outboard Isolation Valves

ID Nos.: HV-51-1F040, HV-51-1F049, HV-51-2F040, HV-51-2F049

P&ID/COORD (respectively): M-51 (SHT 2) / F-3, M-51 (SHT 2) / F-4, M-51 (SHT 6) / G-3. M-51 (SHT 6) / G-4

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 4.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed motor-operated discharge isolation valves to Radwaste perform an active safety function in the closed position. They are opened periodically to transfer water from the Suppression Pool to Radwaste for processing and must be capable of automatic closure upon receipt of a containment isolation signal. They are required to close so that potential Reactor Coolant System drainage paths in the RHR system are isolated when the LPCI mode of operation is initiated, and to prevent voids in the RHR lines which could affect delivery of LPCI flow to the Reactor Vessel. Additionally, a high downstream temperature of 160°F will automatically close the outboard isolation valve (F040).

The valve motor operators are powered from separate Class 1E ac emergency buses to ensure isolation capability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. UFSAR Section 7.3.1.1.1, ECCS - Instrumentation and Controls
2. NRC IE Information Notice No. 86-60: Unanalyzed Post-LOCA Release Paths.
3. Design Baseline Document L-S-09, Residual Heat Removal System
4. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR LPCI Injection Header Testable Check PCIV - Inboard

ID Nos.: HV-51-1F041A, HV-51-1F041B, HV-51-1F041C, HV-51-1F041D, HV-51-2F041A, HV-51-2F041B, HV-51-2F041C, HV-51-2F041D

P&ID/COORD (respectively): M-51 (SHT 1) / F-2, M-51 (SHT 1) / F-2, M-51 (SHT 5) / F-2, M-51 (SHT 5) / F-2, M-51 (SHT 3) / F-7, M-51 (SHT 3) / G-7, M-51 (SHT 7) / F-7, M-51 (SHT 7) / G-7

Code Class: 1 **Category:** A/C **Active/Passive:** A

Size: 12.00 **Valve Type:** TC **Act. Type:** SA

Positions: Normal_C_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): ET-C(F&R), LJ-B, LP-T, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 51-VCS-1

Remarks: Cold shutdown justification 51-VCS-1 allows deferral of exercise testing due to the potential of overpressurizing the low-pressure rated RHR System piping if these valves were opened during normal operation.

Safety Function(s): These normally closed RHR/LPCI inboard injection testable check valves perform active safety functions in the open and closed positions.

Upon automatic opening of the upstream motor-operated outboard LPCI isolation valves (F017), these valves open when the respective RHR Pump discharge pressure overcomes Reactor pressure, to allow LPCI flow to be injected into the Reactor Vessel. The RHR/LPCI System must be capable of providing 10,000 gpm of water per loop from the Suppression Pool into the core region of the Vessel. Therefore, each of these valves must be capable of opening to allow a minimum flow rate of 10,000 gpm.

These valves are identified in UFSAR Tables 6.2-17 & 6.2-25 as primary containment isolation valves for Penetrations X-45A,B,C&D, and in T.S. Table 3.4.3.2-1 as Reactor Coolant pressure boundary isolation valves. As such, they perform active safety functions in the closed position to maintain containment integrity and to provide high to low pressure isolation between the Reactor Coolant and RHR Systems. These valves are identified as an isolation barrier which remains filled with water or as having a water seal which remains in the line post-LOCA. Therefore, valve seat leakage for these valves is not required to be included in the 0.60 L_a total cumulative leakage when testing to 10 CFR 50, Appendix J.

Test Requirement(s):

Exercise test to the open and closed positions during cold shutdown
Position indication verification once every two years
Seat leakage rate test once every two years (for RCPBIV function)
Seat leakage rate test per 10 CFR 50, Appendix J (Option B) (for PCIV function)

Reference(s):

1. LGS Technical Specification Table 3.3.3-2
2. LGS Technical Specification Table 3.4.3.2-1
3. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
4. LGS Technical Specification 3/4.6.3
5. UFSAR Section 5.4.7, Residual Heat Removal System
6. UFSAR Section 6.2.4, Containment Isolation System
7. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
8. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
9. UFSAR Section 7.3.1.1.1.4, LPCI mode of RHR System - Instrumentation and Controls
10. Design Baseline Document L-S-09, Residual Heat Removal System
11. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Heat Exchanger Shell Side Inlet Isolation Valve

ID Nos.: HV-51-1F047A, HV-51-1F047B, HV-51-2F047A, HV-51-2F047B

P&ID/COORD (respectively): M-51 (SHT 1) / C-7, M-51 (SHT 3) / D-2, M-51 (SHT 5) / C-7, M-51 (SHT 7) / D-2

Code Class: 2 **Category:** B **Active/Passive:** P

Size: 18.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_O_ Safety_O_ Failsafe_AI_

Test Frequency (Direction): PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally open valves are located in the shell side inlet piping to the RHR Heat Exchangers. They perform a passive safety function in the open position to allow RHR flow from the Suppression Pool to circulate through the RHR Heat Exchangers during the Suppression Pool Cooling and Containment Spray Cooling modes of RHR system operation. These valves are also required to be open for the Shutdown Cooling mode. They are normally keylocked in the open position and receive no automatic actuation signals.

These valves have no safety function in the closed position. They are not required to change position to support the safety related functions of the RHR System. The only time they are subject to closure is during the performance of maintenance on the Heat Exchangers.

Test Requirement(s):

Position indication verification once every two years

Reference(s):

1. UFSAR Section 5.4.7, Residual Heat Removal System
2. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
3. Design Baseline Document L-S-09, Residual Heat Removal System

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pumps A and B Shutdown Cooling Injection Header Testable Check Valve (Inboard PCIVs)

ID Nos.: HV-51-1F050A, HV-51-1F050B, HV-51-2F050A, HV-51-2F050B

P&ID/COORD (respectively): M-51 (SHT 1) / E-3, M-51 (SHT 3) / F-6, M-51 (SHT 5) / E-3, M-51 (SHT 7) / F-6

Code Class: 1 **Category:** A/C **Active/Passive:** A

Size: 12.00 **Valve Type:** TC **Act. Type:** SA

Positions: Normal OC Safety C Failsafe -

Test Frequency (Direction): ET-C(R), LJ-B, LP-T, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 51-VCS-1

Remarks: Cold shutdown justification 51-VCS-1 allows deferral of exercise testing due to the potential of overpressurizing the low-pressure rated RHR System piping if these valves were opened during normal operation.

Safety Function(s): These normally closed Shutdown Cooling testable check return valves to the Reactor Recirc System have active safety functions in the closed position. They are identified in UFSAR Tables 6.2-17 & 6.2-25 as primary containment isolation valves for Penetrations X-13A&B, and in T.S. Table 3.4.3.2-1 as Reactor Coolant pressure boundary isolation valves. As such, they are required to maintain containment integrity, and to provide high to low pressure isolation between the Reactor Coolant and RHR Systems. They require seat leakage testing for verification of leak tight integrity as both PCIVs and PIVs. However, these valves are identified as an isolation barrier which remains filled with water or as having a water seal which remains in the line post-LOCA. Therefore, valve seat leakage is not required to be included in the 0.60 L_a total cumulative leakage when testing to 10 CFR 50, Appendix J.

These check valves open by pump flow to provide a return flow path to the Reactor Recirc System when RHR is operating in the Shutdown Cooling mode. The Shutdown Cooling mode of RHR is the primary method for placing and maintaining the Reactor in the cold shutdown condition during normal, as well as most abnormal and emergency, shutdown situations.

Test Requirement(s):

Exercise test to the closed position during cold shutdown
Position indication verification once every two years
Seat leakage rate test once every two years (for RCPBIV function)
Seat leakage rate test per 10 CFR 50, Appendix J (Option B) (for PCIV function)

Reference(s):

1. LGS Technical Specification Table 3.4.3.2-1
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 5.4.7, Residual Heat Removal System
5. UFSAR Section 6.2.4, Containment Isolation System
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
8. UFSAR Section 6.3.3, ECCS Performance Evaluation
9. Design Baseline Document L-S-09, Residual Heat Removal System
10. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Heat Exchanger RHRSW Outlet Valve

ID Nos.: HV-51-1F068A, HV-51-1F068B, HV-51-2F068A, HV-51-2F068B

P&ID/COORD (respectively): M-51 (SHT 2) / B-4, M-51 (SHT 4) / C-6, M-51 (SHT 6) / B-4, M-51 (SHT 8) / C-6

Code Class: 3 **Category:** B **Active/Passive:** A

Size: 20.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal OC Safety O Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed, motor-operated valves are located in the RHRSW outlet lines from the tube side of the RHR Heat Exchangers. They perform an active safety function in the open position. They must be capable of opening, by remote manual switch actuation, to allow RHRSW flow through the RHR Heat Exchangers for heat transfer when the RHR System is operating in the Suppression Pool Cooling, Containment Spray Cooling or Shutdown Cooling modes of operation.

These valves do not perform a safety function in the closed position. They automatically close upon receipt of a high radiation level signal detected at the RHRSW discharge from the respective RHR Heat Exchanger. However, this function has been determined not to be safety related, since any leakage would be contained in a closed loop with the Spray Pond. RHRSW flow isolation to the individual RHR Heat Exchangers is provided by the inlet isolation valves, F014A&B, which ensures RHRSW flow isolation from a faulted Heat Exchanger.

The valve motor operators are powered by the Class 1E emergency ac bus to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open position
Position indication verification once every two years

Reference(s):

1. UFSAR Section 6.2.2, Containment Heat Removal System
2. UFSAR Section 9.2.3, RHR Service Water System
3. Design Baseline Document L-S-04, Residual Heat Removal Service Water System
4. Design Baseline Document L-S-09, Residual Heat Removal System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052
6. NRC Letter, August 7, 1987, RHRSW Process Radiation Monitors, TAC # 65866

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Service Water Crosstie to RHR

ID Nos.: HV-51-1F075, HV-51-2F075

P&ID/COORD (respectively): M-51 (SHT 4) / G-5, M-51 (SHT 6) / D-7

Code Class: 2 **Category:** B **Active/Passive:** P

Size: 18.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_C_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed valves, one of two in series, are located in the RHRSW crosstie to the RHR System. They perform a passive safety function in the closed position. They are installed to provide the capability of utilizing RHRSW to flood the Reactor Vessel via the LPCI injection lines to permit de-fueling of the Reactor core and eventual shutdown of the ECCS. During and after flooding, the ECCS would remain available for core cooling if required. Safety related equipment is not required to be provided to perform such long term accident recovery functions where abundant time is available to perform the functions and/or provide alternate means of accomplishing such functions if the installed means failed to operate. Therefore, the RHRSW crosstie alignment is not a safety related function.

These valves perform a passive safety function in the closed position to provide isolation between RHR return flow from the heat exchanger and the RHRSW supply piping. These valves are located upstream of check valve F078, and downstream of series isolation valve F073, which constitutes a three valve isolation barrier. This alignment is never placed inservice, therefore position indication verification of only one of the series valves is sufficient to ensure adequate isolation boundary is maintained.

Test Requirement(s):

Position indication verification at least once every 2 years

Reference(s):

1. Design Baseline Document L-S-09, Residual Heat Removal System
2. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Heat Exchanger Sample Line Inboard/Outboard Isolation Valves

ID Nos.: HV-51-1F079A, HV-51-1F079B, HV-51-1F080A, HV-51-1F080B, HV-51-2F079A, HV-51-2F079B, HV-51-2F080A, HV-51-2F080B

P&ID/COORD (respectively): M-51 (SHT 2) / E-6, M-51 (SHT 2) / E-7, M-51 (SHT 6) / E-6, M-51 (SHT 6) / E-7, M-51 (SHT 4) / F-4, M-51 (SHT 4) / F-3, M-51 (SHT 8) / F-4, M-51 (SHT 8) / F-4

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** AO

Positions: Normal OC Safety C Failsafe C

Test Frequency (Direction): ET-Q, ST-Q(C), FS-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These air-operated process sampling isolation valves perform an active safety function in the closed position. These normally closed valves are periodically opened during normal operation to monitor RHR A and B Heat Exchanger effluent for water quality. They must be capable of automatic closure, if open, upon receipt of isolation signals initiated by the Primary Containment Isolation System in order to prevent diversion of flow in the event of a LPCI initiation, or when using the Suppression Pool Cooling or Containment Spray Cooling modes of RHR System operation. They also perform an active safety function in the closed position to prevent loss of Reactor Vessel inventory during the Shutdown Cooling mode of operation.. They fail to the closed position upon loss of air or loss of electrical power.

These valves have no safety function in the open position. They may be opened following an accident to supply a Post-Accident Sampling System (PASS) sampling station. Although the PASS can provide very useful information regarding core and primary containment conditions via the RHR sampling line, it is not required to perform any specific function in shutting down the Reactor or in mitigating the consequences of an accident. Moreover, the PASS is not an ASME Safety Class system, and is therefore outside the scope of 10 CFR 50.55a, with the exception of those containment isolation located within the system.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Quarterly fail-safe test to the closed position
Position indication verification once every two years

Reference(s):

1. UFSAR Section 7.3.1.1.1, ECCS - Instrumentation and Controls
2. Design Baseline Document L-S-09, Residual Heat Removal System
3. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052
4. NUREG 1482, Section 4.4.2, Post Accident Sampling System Valves.

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Heat Exchanger Shell Side Bypass Valves

ID Nos.: HV-C-51-1F048A, HV-C-51-1F048B, HV-C-51-2F048A, HV-C-51-2F048B

P&ID/COORD (respectively): M-51 (SHT 1) / E-7, M-51 (SHT 3) / E-2,
M-51 (SHT 5) / E-7, M-51 (SHT 7) / E-2

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 18.00 **Valve Type:** BF **Act. Type:** MO

Positions: Normal O Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These motor operated heat exchanger bypass valves perform active safety functions in the open and closed positions.

These normally open valves perform an active safety function in the open position to ensure loops A and B are aligned to the Reactor Vessel LPCI injection nozzles for maximum flow delivery upon LPCI initiation. Additionally, these valves receive a signal to automatically open upon LPCI initiation. They are interlocked with a 3-minute timer which seals in the open position to prevent bypass valve closure, thereby ensuring all available flow is directed to the Vessel. They may be required to reopen, if closed to support Suppression Pool Cooling or Containment Spray Cooling, in order to re-establish LPCI injection flow.

These valves also perform an active safety function in the closed position. They must be capable of closure by remote manual switch actuation, after expiration of the 3-minutes, to allow loops A and B RHR flow to be directed through the RHR Heat Exchangers to support the Suppression Pool Cooling or Containment Spray Cooling modes of operation. They are also closed in order to place and maintain the Reactor in the cold shutdown condition when in the Shutdown Cooling mode.

The valve motor operators are powered from Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. UFSAR Section 6.2.2, Containment Heat Removal System
2. UFSAR Section 7.3.1.1.1, ECCS - Instrumentation and Controls
3. Design Baseline Document L-S-09, Residual Heat Removal System
4. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Heat Exchangers A and B Vent Valves PCIV

ID Nos.: HV-C-51-1F103A, HV-C-51-1F104B, HV-C-51-2F103A, HV-C-51-2F104B

P&ID/COORD (respectively): M-51 (SHT 2) / C-7, M-51 (SHT 4) / D-4, M-51 (SHT 6) / C-7, M-51 (SHT 8) / D-4

Code Class: 2 **Category:** A **Active/Passive:** P

Size: 1.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal C Safety C Failsafe AI

Test Frequency (Direction): LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These RHR Heat Exchanger vent valves perform a passive safety function in the closed position. They were intended to provide a means of venting noncondensible gases from the Heat Exchangers when operating the RHR System in the Steam-Condensing mode. However, this mode of RHR System operation has been disabled and abandoned in place on Unit 1 such that the valves are no longer connected to the Heat Exchangers. On Unit 2, this mode of RHR System operation is administratively controlled to prevent its use. These valves are not subject to be opened and are de-energized, or administratively controlled in the closed position. They are identified in UFSAR Tables 6.2-17 & 6.2-25 as primary containment isolation valves for Penetrations X-238 and X-239. As such, they must be leak tested to demonstrate their capability to maintain containment integrity. They are located in lines which discharge to the Suppression Chamber and terminate at least 4 feet below the minimum Suppression Pool water level. A 30 day water seal is assured on the submerged portion of the line during post-accident conditions. Therefore, valve seat leakage is not required to be included in the 0.60 L_a total cumulative leakage when testing to 10 CFR 50, Appendix J.

Test Requirement(s):

Position indication verification once every two years (Unit 2 valves only; Unit 1 valves are de-energized).
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.3.2.3.1, Water Seals
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. Design Baseline Document L-S-09, Residual Heat Removal System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052
7. LGS Modification 6240

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Heat Exchangers A and B Vent Valves

ID Nos.: HV-C-51-1F103B, HV-C-51-1F104A, HV-C-51-2F103B, HV-C-51-2F104A

P&ID/COORD (respectively): M-51 (SHT 4) / D-5 M-51 (SHT 2) / C-6
M-51 (SHT 8) / D-5 M-51 (SHT 8) / D-6

Code Class: 2 **Category:** N/A **Active/Passive:** N/A

Size: 1.00 **Valve Type:** GL **Act. Type:** MO/AO

Positions: Normal C Safety N/A Failsafe AI

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally closed, RHR Heat Exchanger vent valves do not perform a safety function in either the open or closed positions. They were intended to provide a means of venting noncondensible gases from the Heat Exchangers when operating the RHR System in the Steam-Condensing mode. However, this mode of RHR System operation has been disabled and abandoned in place on Unit 1 such that the valves are no longer connected to the Heat Exchangers. On Unit 2, this mode of RHR System operation is administratively controlled to prevent its use. These valves are not subject to be opened and are de-energized, or administratively controlled in the closed position. They are not a part of the containment isolation boundary.

Test Requirement(s):

No testing requirements

Reference(s):

1. UFSAR Section 5.4.7, Residual Heat Removal System
2. Design Baseline Document L-S-09, Residual Heat Removal System
3. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052
4. LGS Modification 6240

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Heat Exchanger Tube Side (RHRSW) Thermal Relief Valve

ID Nos.: PSV-51-105A, PSV-51-105B, PSV-51-205A, PSV-51-205B

P&ID/COORD (respectively): M-51 (SHT 2) / B-5, M-51 (SHT 4) / C-5, M-51 (SHT 6) / B-5, M-51 (SHT 8) / C-6

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 0.75 **Valve Type:** RL **Act. Type:** SA

Positions: Normal_C_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): RT-P3 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These pressure relief valves are located on the tube side (RHRSW) of the RHR Heat Exchangers and perform an active safety function by providing overpressure protection to the Heat Exchanger tubes due to thermal expansion when the RHRSW is isolated. Failure of these valves to relieve pressure, due to thermal expansion, could result in a tube rupture, thereby compromising the ability of the RHR Heat Exchangers to perform their safety function.

Test Requirement(s):

Relief valve test once every 10 years

Reference(s):

1. UFSAR Section 6.2.2, Containment Heat Removal System
2. UFSAR Section 9.2.3, RHR Service Water System
3. Design Baseline Document L-S-04, Residual Heat Removal Service Water System
4. Design Baseline Document L-S-09, Residual Heat Removal System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Heat Exchanger Shell Side (RHR) Discharge Thermal Relief Valve - PCIV

ID Nos.: PSV-51-106A, PSV-51-106B, PSV-51-206A, PSV-51-206B

P&ID/COORD (respectively): M-51 (SHT 2) / D-6, M-51 (SHT 4) / D-5, M-51 (SHT 6) / D-6, M-51 (SHT 8) / D-5

Code Class: 2 **Category:** A/C **Active/Passive:** A

Size: 0.75 **Valve Type:** RL **Act. Type:** SA

Positions: Normal C Safety OC Failsafe -

Test Frequency (Direction): RT-P3, LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): As required by ASME Section III, Article NC-7000, the RHR Heat Exchanger shell side thermal relief/PCIV valves are required to protect the associated RHR Heat Exchanger and piping in the event that these components are isolated. The RHR Heat Exchanger inlet and outlet valves, F047 and F003, are keylocked in the open position which prevents the heat exchanger shell side from inadvertently being isolated. This precludes the possibility of thermal overpressurization.

These valves are identified in UFSAR Tables 6.2-17 & 6.2-25 as primary containment isolation valves for Penetrations X-238 and X-239. As such, they must be leak tested, or (if a balanced relief valve) receive a bellows integrity test, to demonstrate their capability to maintain containment integrity. The relief valves' discharge line is directed to the Suppression Chamber and terminates at least 4 feet below the minimum Suppression Pool water level. A 30 day water seal is assured on the submerged portion of the line during post accident conditions. Therefore, seat leakage for these valves is not required to be included in the 0.60 L_a total cumulative leakage when testing to 10 CFR 50, Appendix J.

Test Requirement(s):

Relief valve test once every 10 years
Seat leakage testing per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.3.2.3.1, Water Seals
3. UFSAR Section 6.2.4.3.1.3.1.3, RHR Heat Exchanger Relief Valve Discharge Lines
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. Design Baseline Document L-S-09, Residual Heat Removal System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pumps A and B Shutdown Cooling Suction Supply Line Safety Relief Valve - PCIV

ID Nos.: PSV-51-155, PSV-51-255

P&ID/COORD (respectively): M-51 (SHT 1) / E-2, M-51 (SHT 5) / E-2

Code Class: 1 **Category:** A/C **Active/Passive:** A

Size: 0.75 **Valve Type:** RL **Act. Type:** SA

Positions: Normal_C_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): RT-P2, LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These Shutdown Cooling suction supply line relief valves perform active safety functions in the open and closed positions. They are located in the penetration piping between the normally closed inboard and outboard Shutdown Cooling isolation valves, HV-51-1(2)F008 and HV-51-1(2)F009. They perform an active safety function to provide overpressure protection, due to thermal expansion, to the associated penetration piping.

These valves are identified in UFSAR Tables 6.2-17 & 6.2-25 as primary containment isolation valves for Penetration X-12. As such, they must be leak tested to demonstrate their capability to maintain containment integrity.

Test Requirement(s):

Relief valve test once every 5 years
Seat leakage testing per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.4.3.2-1
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 5.4.7, Residual Heat Removal System
5. UFSAR Section 6.2.4, Containment Isolation System
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
8. UFSAR Section 6.3.3, ECCS Performance Evaluation
9. Design Baseline Document L-S-09, Residual Heat Removal System
10. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: LPCI Injection Line Thermal Relief Valve

ID Nos.: PSV-51-1F025A, PSV-51-1F025B, PSV-51-1F025C, PSV-51-1F025D, PSV-51-2F025A, PSV-51-2F025B, PSV-51-2F025C, PSV-51-2F025D

P&ID/COORD (respectively): M-51 (SHT 1) / G-5, M-51 (SHT 3) / G-4,
M-51 (SHT 1) / G-4, M-51 (SHT 3) / G-5,
M-51 (SHT 5) / G-5, M-51 (SHT 7) / G-4,
M-51 (SHT 5) / G-4, M-51 (SHT 7) / G-5,

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** RL **Act. Type:** SA

Positions: Normal C Safety OC Failsafe -

Test Frequency (Direction): RT-P3 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These relief valves are located on the inlet lines from the Condensate Transfer System to the RHR System which provide normal keepfill flow to the LPCI injection headers. They provide overpressure protection for that portion of the RHR System between the pump discharge check valves and the injection isolation valves on each of the four LPCI headers as required by ASME Section III, Article ND-7000. The A and B loop valves also provide overpressure protection for those portions of the RHR discharge lines used for the Shutdown Cooling, Suppression Pool Cooling and Containment Spray Cooling modes of RHR System operation.

Test Requirement(s):

Relief valve test once every 10 years

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. UFSAR Section 6.3.2.2.4, Low Pressure Coolant Injection System
3. UFSAR Section 6.3.3.3, ECCS Performance Evaluation
4. Design Baseline Document L-S-09, Residual Heat Removal System
5. LGS Modification 5010
6. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052
7. ECR 95-13-0
8. ECR LG 96-00752 Rev. 0

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pump Shutdown Cooling Suction Line Thermal Relief Valve

ID Nos.: PSV-51-1F029, PSV-51-2F029

P&ID/COORD (respectively): M-51 (SHT 1) / C-4, M-51 (SHT 5) / C-4

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** RL **Act. Type:** SA

Positions: Normal_C_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): RT-P3 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These pressure relief valves are located in a normally isolated portion of the RHR Pumps Shutdown Cooling supply line from the Reactor Recirc System between the outboard containment isolation valve, F008, and the RHR A and B Pump Shutdown Cooling suction isolation valves, F006A and B. Overpressure protection of isolated components is required by ASME Section III, Article NC-7000.

Leakage from the Reactor Coolant System into this portion of the RHR System at a rate greater than the leakage out of it is unlikely; however, the potential still exists for it to occur. Since the portion of the RHR System protected by these valves is the primary, preferred method used to place and maintain the Reactor in cold shutdown, these valves are subject to IST Program requirements.

Test Requirement(s):

Relief valve test once every 10 years

Reference(s):

1. UFSAR Section 5.4.7, Residual Heat Removal System
2. Design Baseline Document L-S-09, Residual Heat Removal System
3. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052

System (No): Residual Heat Removal (RHR) System (51)

Component Description: RHR Pump Suction Pressure Relief Valve

ID Nos.: PSV-51-1F030A, PSV-51-1F030B, PSV-51-1F030C, PSV-51-1F030D, PSV-51-2F030A, PSV-51-2F030B, PSV-51-2F030C, PSV-51-2F030D

P&ID/COORD (respectively): M-51 (SHT 1) / C-3, M-51 (SHT 1) / C-2, M-51 (SHT 5) / C-3, M-51 (SHT 5) / C-2, M-51 (SHT 3) / C-6, M-51 (SHT 3) / C-7, M-51 (SHT 7) / C-6, M-51 (SHT 7) / C-7

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** RL **Act. Type:** SA

Positions: Normal_C_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): RT-P3 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These relief valves are located in the RHR Pumps suction piping with their discharges routed to the upstream side of the RHR Pumps Suction Supply from Suppression Pool PCIV's (F004's). They are listed in UFSAR Table 6.2-17 as containment isolation valves and were originally included in the IST Program for Appendix J Type C leak testing. However, licensing change request 95-13-0 was approved by the NRC to remove these requirements. Because these lines penetrate below the minimum required Suppression Pool level, a water seal is maintained at all times, thereby assuring isolation of the outside environment from the containment atmosphere in the event of an accident. Therefore, these valves are no longer credited with performing a primary containment isolation safety function.

The potential for overpressurization to occur in the portion of the system served by these valves is very remote. During power operation, the RHR System is maintained in standby for the LPCI mode and the F004 valves are keylocked in the open position. In the event of a LPCI initiation, or if placing RHR in the Suppression Pool Cooling mode or Containment Spray modes, the F004 valves would likewise be open. Under these conditions, the inlets and outlets of these relief valves are subject to equal pressure and there is no mechanism for overpressure to occur. In the Shutdown Cooling mode, the F004 valves are closed, but pressure interlocks prevent the Shutdown Cooling suction valves from opening at high pressure, which precludes the possibility of an overpressure condition from occurring. It appears, then, that the only means for overpressurization to occur would be from thermal expansion when the applicable portion of the RHR loop is isolated. Isolation of these portions of the RHR System would only be done if required for maintenance, in which case the probability of adding heat is very low, and the loop would most likely be drained, further diminishing the potential for an overpressure condition to occur. Nevertheless, Article NC-7000 of ASME Section III requires that individual components which can be isolated from the normal overpressure protection be protected and the portion of the RHR System protected by these valves has multiple functions in shutting down the Reactor to the cold shutdown condition, in maintaining the cold shutdown condition, and in mitigating the consequences of an accident. Therefore, these valves are included in the IST Program.

Test Requirement(s):

Relief valve test once every 10 years

Reference(s):

1. UFSAR Section 5.4.7, Residual Heat Removal System
2. UFSAR Section 6.3.3, ECCS Performance Evaluation
3. Design Baseline Document L-S-09, Residual Heat Removal System
4. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052
5. LCR 95-13-0
6. ECR LG 96-00752, Rev. 0

System (No): Residual Heat Removal (RHR) System (51)

Component Description: Excess Flow Check Valves for LPCI Isolation Valve Leakage Detection, PDT-1(2)N058A,B,C&D - PCIVs

ID Nos.: XV-51-102A, XV-51-102B, XV-51-102C, XV-51-102D, XV-51-202A, XV-51-202B, XV-51-202C, XV-51-202D

P&ID/COORD (respectively): M-51 (SHT 1) / F-3, M-51 (SHT 3) / F-5, M-51 (SHT 1) / F-3, M-51 (SHT 3) / F-6, M-51 (SHT 5) / F-3, M-51 (SHT 7) / F-5, M-51 (SHT 5) / F-3, M-51 (SHT 7) / F-6

Code Class: 1 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** XC **Act. Type:** SA

Positions: Normal O Safety C Failsafe -

Test Frequency (Direction): ET-R(F), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: GVROJ-2

Remarks: Refueling outage justification GVROJ-2 allows functional testing of excess flow check valves to be performed at refueling.

Safety Function(s): Per Regulatory Guide 1.11 (Safety Guide 11), an excess flow check valve may satisfy the containment isolation criteria of 10CFR50, Appendix A (General Design Criteria 55 and 56). For instrument lines penetrating containment that are part of the protection system, excess flow check valves are acceptable provided the instrument sensing lines are sized or orificed such that in the event of a postulated piping or component failure (1) leakage is reduced to the maximum extent practical consistent with other safety requirements, (2) the rate and extent of coolant loss is within the capability of the reactor coolant makeup system, (3) the integrity and performance of the secondary containment and associated safety systems will be maintained and (4) the potential offsite exposure will be substantially less than 10CFR100 requirements.

These normally open, 1 inch excess flow check valves are located at Penetrations X-66B, X-20A, X-20B and X-66A. They have an active safety function to close in order to provide containment isolation and Reactor Coolant pressure boundary (RCPB) integrity. The UFSAR stipulates that instrument lines from the RCPB which penetrate the containment shall conform with Reg. Guide 1.11, which requires that they be equipped with a restricting orifice located inside the drywell, and an EFCV located outside and as close as practicable to the containment. In the event that an instrument line that communicates with the RCPB develops a leak outside the containment, a flow rate that results in a differential pressure across the valve of 3-10 psi causes the EFCV to close automatically. If an EFCV fails to close when required, the main flow path through the valve has a resistance to flow at least equivalent to a .375 inch diameter orifice.

These valves do not require Type C leak rate testing. The line does not isolate during a LOCA, and only leaks if the downstream check valves fail to seat. Leak tightness of the line is verified during the ILRT (Type A Test).

Test Requirements:

Exercise test in the forward direction during refueling outages.
Position indication verification at least once every 2 years

References:

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.4, Containment Isolation System
3. Regulatory Guide 1.11, Instrument Lines Penetrating Primary Reactor Containment
4. Design Baseline Document L-S-09, Residual Heat Removal System

System (No): Residual Heat Removal (RHR) System (51)

Component Description: Excess Flow Check Valves for LPCI Injection Line Differential Pressure, PDT-1(2)N060A,B,C&D - PCIVs

ID Nos.: XV-51-103A, XV-51-103B, XV-51-103C, XV-51-103D, XV-51-203A, XV-51-203B, XV-51-203C, XV-51-203D

P&ID/COORD (respectively): M-51 (SHT 1) / G-3, M-51 (SHT 3) / H-6, M-51 (SHT 1) / G-3, M-51 (SHT 3) / G-6, M-51 (SHT 5) / G-3, M-51 (SHT 7) / H-6, M-51 (SHT 5) / G-3, M-51 (SHT 7) / G-6

Code Class: 1 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** XC **Act. Type:** SA

Positions: Normal_O_ Safety_C_ Failsafe_-_

Test Frequency (Direction): ET-R(F), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: GVROJ-2

Remarks: Refueling outage justification GVROJ-2 allows functional testing of excess flow check valves to be performed at refueling.

Safety Function(s): Per Regulatory Guide 1.11 (Safety Guide 11), an excess flow check valve may satisfy the containment isolation criteria of 10CFR50, Appendix A (General Design Criteria 55 and 56). For instrument lines penetrating containment that are part of the protection system, excess flow check valves are acceptable provided the instrument sensing lines are sized or orificed such that in the event of a postulated piping or component failure (1) leakage is reduced to the maximum extent practical consistent with other safety requirements, (2) the rate and extent of coolant loss is within the capability of the reactor coolant makeup system, (3) the integrity and performance of the secondary containment and associated safety systems will be maintained and (4) the potential offsite exposure will be substantially less than 10CFR100 requirements.

These normally open, 1 inch excess flow check valves are located at Penetrations X-41, X-20A, X-66B and X-66A. They have an active safety function to close in order to provide containment isolation and Reactor Coolant pressure boundary (RCPB) integrity. The UFSAR stipulates that instrument lines from the RCPB which penetrate the containment shall conform with Reg. Guide 1.11, which requires that they be equipped with a restricting orifice located inside the drywell, and an EFCV located outside and as close as practicable to the containment. In the event that an instrument line that communicates with the RCPB develops a leak outside the containment, a flow rate that results in a differential pressure across the valve of 3-10 psi causes the EFCV to close automatically. If an EFCV fails to close when required, the main flow path through the valve has a resistance to flow at least equivalent to a .375 inch diameter orifice.

These valves do not require Type C leak rate testing. The line does not isolate during a LOCA, and only leaks if the downstream check valves fail to seat. Leak tightness of the line is verified during the ILRT (Type A Test).

Test Requirements:

Exercise test in the reverse direction during refueling outages.
Position indication verification at least once every 2 years

References:

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.4, Containment Isolation System
3. Regulatory Guide 1.11, Instrument Lines Penetrating Primary Reactor Containment
4. Design Baseline Document L-S-09, Residual Heat Removal System

System (No): Residual Heat Removal (RHR) System (51)

Component Description: Various Valves Associated With RHR Steam Condensing Mode

ID Nos.: HV-51-153A, HV-51-153B, HV-C-51-154A, HV-C-51-154B, HV-51-1F011A, HV-51-1F011B, HV-51-1F052A, HV-51-1F052B, LV-C-51-1F053A, LV-C-51-1F053B, PV-C-51-1F051A, PV-C-51-1F051B, HV-51-253A, HV-51-253B, HV-C-51-254A, HV-C-51-254B, HV-51-2F011A, HV-51-2F011B, HV-51-2F052A, HV-51-2F052B, LV-C-51-2F053A, LV-C-51-2F053B, PV-C-51-2F051A, PV-C-51-2F051B

P&ID: M-51 (Sheets 2, 4, 6, and 8)

Code Class: 2 **Category:** N/A **Active/Passive:** N/A

Size: Various **Valve Type:** GT/GL **Act. Type:** MO/AO

Positions: Normal C Safety N/A Failsafe AI

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): The above valves represent those valves which were associated with the steam condensing mode of the RHR system and which serve as boundary valves with RHR system piping required to perform a safety related function. The non-safety related steam condensing mode of RHR has been disabled and abandoned in place. All power operated valves, and any associated interlocks, have been de-energized or otherwise disabled with all valves in the closed position rendering this portion of the RHR system permanently inoperable. Furthermore, all disabled boundary barrier valves are backed up by additional valves which are disabled in the closed position. No periodic testing shall be performed.

Test Requirement(s):

No testing requirements

Reference(s):

1. Design Baseline Document L-S-09, Residual Heat Removal System

CORE SPRAY (CS) SYSTEM

System (No): Core Spray (CS) System (52)

Component Description: Core Spray (CS) Pumps

ID Nos.: 1AP206, 1BP206, 1CP206, 1DP206
2AP206, 2BP206, 2CP206, 2DP206

P&ID/COORD (respectively): M-52 (SHT 2) / C-7, C-3, C-5, C-2,
M-52 (SHT 4) / C-7, C-3, C-5, C-2

Pump Type: Centrifugal **Test Parameters:** D/P, Q, V

Relief Request: N/A

Remarks:

Safety Function(s): The CS Pumps have an active safety function to provide cooling spray water to the Reactor Vessel upon receipt of a Reactor low water level - Level 1 or high dry well pressure actuation signal coincident with Reactor low pressure to mitigate the consequences of a LOCA. The CS Pumps provide adequate cooling capacity for all line break sizes up to and including the double-ended Reactor Recirculation line break, and for smaller breaks following depressurization by ADS.

The CS Pumps deliver water from the Suppression Pool to the spray spargers above the fuel rods to cool the core and limit cladding temperature. Each pump is capable of supplying a minimum of 50% of the required flow, so that either loop can satisfy 100% of design flow requirements. Each pump must be capable of delivering a minimum of 3175 gpm in order to meet its safety function when the pressure in the Reactor Vessel has decreased to below the shutoff head of the CS Pumps (≈ 330 psig). The minimum system flow rate, per loop, for short term core cooling is 6350 gpm and 7000 gpm for long term cooling. The pumps are normally in the standby mode and are started automatically upon receipt of an actuation signal. If offsite ac power is available, the CS Pumps in loop "A" start after a 10 second time delay, and the CS Pumps in loop "B" start after a 15 second time delay. If offsite ac power is not available, the CS Pumps in both loops start 7 seconds after standby power becomes available for loading. The CS system can also be initiated remotely by switches in the Control Room.

The CS Pumps may also perform the safety-related function of providing an alternate means of shutdown cooling to remove decay heat from the core in the event that the Shutdown Cooling mode of RHR is unavailable. The alternate shutdown cooling path utilizes the CS Pumps to pump water from the Suppression Pool into the Reactor Vessel.

After circulating through the Vessel, the water overflows through an open ADS valve back to the Suppression Pool. The Suppression Pool is then cooled by the RHR System operating in the Suppression Pool Cooling mode.

Each CS Pump motor is supplied from a separate Class 1E emergency ac bus. Control power for pumps A through D is from the corresponding Class 1E 125 V dc buses A through D.

Test Requirement(s):

Quarterly pump testing

References:

1. LGS Technical Specification Table 3.2.2-2
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. LGS Technical Specification Bases 3/4.6.2
4. UFSAR Section 6.3.2.2.3, Core Spray System
5. UFSAR Sections 7.3.1.1.1.3, CS System - Instrumentation and Controls
6. UFSAR Chapter 15, Accident Analysis
7. Design Baseline Document L-S-42, Nuclear Boiler System
8. Design Baseline Document L-S-44, Core Spray System
9. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049

System (No): Core Spray (CS) System (52)

Component Description: Safeguard Piping Fill to CS Injection Line Check Valves

ID Nos.: 52-1045A, 52-1045B, 52-1046A, 52-1046B
52-2045A, 52-2045B, 52-2046A, 52-2046B

P&ID/COORD (respectively): M-52 (SHT 2) / E-6, E-2, E-5, E-2,
M-52 (SHT 4) / E-6, E-2, E-5, E-2

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.50 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_C_ Safety_C_ Failsafe_-_

Test Frequency (Direction): ET-Q(R) (A valves)
DI-P6, PT-DI @ (B valves) **Appendix J, Type C:** N

VRR/VCS/ROJ: GVRR-4 (A valves)
GVROJ-1 (B valves)

Remarks: Relief request GVRR-4 allows testing of these series check valves in the reverse direction as a unit, as described in NUREG 1482, Section 4.1.1. Refueling outage justification GVROJ-1 documents operability verification of these check valves by sample disassembly and inspection per GL 89-04 Position 2.

Safety Function(s): The safeguard piping fill supply to CS system check valves perform an active safety function in the closed position. They must be capable of closure to prevent diversion of CS discharge flow to the safeguard piping fill system, and to provide high to low pressure boundary isolation between the CS system and the lower design pressure piping of the safety related safeguard piping fill system. Failure of these valves to close could compromise the ability of the CS system to fulfill its design safety function by allowing loss of CS flow through a possibly faulted line. Additionally, failure for these valves to close could render the safeguard piping fill system inoperable due to overpressurization.

These valves do not perform a safety function in the open position. The CS system is analyzed to be placed in operation once during post-LOCA conditions. System restart capability is beyond design basis. Therefore, the ability for the stayfill check valves to open, subsequent to system initiation for reestablishment of a solid discharge piping condition, is not a safety function. Subsequent to quarterly pump testing the system is placed in standby with discharge piping in a solid condition. Piping level is continuously monitored to ensure the system is maintained in a solid state. Should a decline in discharge piping level occur, an alarm would initiate operator action to refill the system. Reestablishing the system to a standby condition subsequent to testing is accomplished by the condensate system and is not a safety related function.

Test Requirement(s):

Exercise test in the reverse direction as a unit quarterly (A valves)
Verification of valve operability by sample disassembly and inspection during refueling outages or associated system outages (B valves)

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. UFSAR Section 6.3.2.2.3, Core Spray System
3. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
4. UFSAR Sections 7.3.1.1.1.3, CS System - Instrumentation and Controls
5. UFSAR Chapter 15, Accident Analysis
6. Design Baseline Document L-S-44, Core Spray System
7. NRC Generic Letter (GL) 89-04, Supplement 1, Guide on Developing Acceptable Inservice Testing Programs
8. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 4.1.1
9. GE SIL No. 375, Power Supply for Discharge Fill Systems on BWR/4,5 & 6.
10. Engineering Work Request (EWR) L-00364
11. ECR LG 95-00862 Rev. 0

System (No): Core Spray (CS) System (52)

Component Description: Safeguard Piping Fill Pump Minimum Flow Recirculation Check Valve

ID Nos.: 52-1048A, 52-1048B, 52-2048A, 52-2048B

P&ID/COORD (respectively): M-52 (SHT 2) / A-5, B-3,
M-52 (SHT 4) / A-5, B-3

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_C_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): DI-P6, PT-DI @ ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: GVROJ-1

Remarks: Refueling outage justification GVROJ-1 documents operability verification of these check valves by sample disassembly and inspection per GL 89-04 Position 2.

Safety Function(s): The Safeguard Piping Fill Pump minimum flow recirculation check valves perform active safety functions in the open and closed directions.

The Safeguard Piping Fill Pumps are manually started and run continuously when the non-safety related Condensate Transfer Pumps are unavailable. Under normal operating conditions, the RCIC and ECCS discharge lines are maintained full and require little, if any, keepfill flow. The fill pumps operate in a standby mode by continuously recirculating their discharge flow to the Suppression Pool. These check valves must open to allow this recirculation flow, thereby protecting the pumps from overheating when operating in a low flow condition. These check valves must pass a minimum of 20 gpm in order to accomplish their required safety function.

These valves also perform an active safety function in the closed position to prevent diversion of CS pump suction supply flow to the safeguard piping fill and attached systems. Flow diversion would be possible only when the Condensate Transfer System remains in operation and the Safeguard Piping Fill System is in an idle condition.

Test Requirement(s):

Quarterly exercise test to the open position
Verification of valve operability to the closed position by sample disassembly during refueling outages or associated system outages.

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. UFSAR Section 6.3.2.2.3, Core Spray System
3. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
4. Design Baseline Document L-S-44, Core Spray System
5. NRC Generic Letter (GL) 89-04, Supplement 1, Guide on Developing Acceptable Inservice Testing Programs
6. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 4.1.1
7. GE SIL No. 375, Power Supply for Discharge Fill Systems on BWR/4,5 & 6.
8. Engineering Work Request (EWR) L-00364
9. ECR LG 95-00862, Rev. 0

System (No): Core Spray (CS) System (52)

Component Description: Post Accident Sampling Return To CS System Check Valve

ID Nos.: 52-1061, 52-2061

P&ID/COORD (respectively): M-52 (SHT 2) / B-2, M-52 (SHT 4) / A-5

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_C_ Failsafe_-_

Test Frequency (Direction): DI-P6 PT-DI@ **Appendix J, Type C:** N

VRR/VCS/ROJ: GVROJ-1

Remarks: Refueling outage justification GVROJ-1 documents operability verification of these check valves by sample disassembly and inspection per GL 89-04 Position 2.

Safety Function(s): These post accident sampling return check valves to the CS system perform an active safety function in the closed position. These valves serve as a Class 2 to non-Code boundary valve, and must be capable of closure to prevent a loss of Suppression Pool inventory

These check valves do not perform a safety function in the open position. The Post Accident Sampling System is not required to perform any specific function in the safe shutdown of the Reactor or for accident mitigation. This position is supported by NUREG-1482, Section 4.4.2.

Test Requirement(s):

Verification of valve operability to the closed position by sample disassembly during refueling outages or associated system outages.

Reference(s):

1. UFSAR Section 6.3.2.2.3, Core Spray System
2. UFSAR Table 7.5-3, Post Accident Monitoring Instrumentation
3. UFSAR Section 11.5.5, Post Accident Sampling System
4. Design Baseline Document L-S-44, Core Spray System
5. Design Baseline Document L-S-49, Post Accident Sampling System
6. NRC Generic Letter (GL) 89-04, Supplement 1, Guide on Developing Acceptable Inservice Testing Programs
7. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 4.4.2
8. ECR LG 95-04491 Rev.0
9. ECR LG 95-00862 Rev.0

System (No): Core Spray (CS) System (52)

Component Description: Condensate Storage Tank Crosstie to CS Pump Suction Supply Isolation Valves

ID Nos.: 52-1F002A, 52-1F002B, 52-1F002C, 52-1F002D
52-2F002A, 52-2F002B, 52-2F002C, 52-2F002D

P&ID/COORD (respectively): M-52 (SHT 2) / B-7, B-4, B-7, B-3,
M-52 (SHT 4) / B-7, B-4, B-7, B-3

Code Class: 2 **Category:** B **Active/Passive:** P

Size: 14.00 **Valve Type:** GT **Act. Type:** MA

Positions: Normal_LC_ Safety_C_ Failsafe_-_

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These locked-closed manual valves are located in the CS Pump suction supply cross-tie lines from the Condensate Storage Tank. They perform a passive safety function in the closed position by providing an isolation barrier between the Class 2 CS suction supply piping from the Suppression Pool and the non-Code, Seismic IIA piping from the Condensate Storage Tank.

These valves do not perform a safety function in the open position. They are opened during the Vessel injection flow testing of the CS Pumps, which requires a higher quality of water than that provided by the Suppression Pool. This testing is performed during refueling outages when the System is not required to be operable. Furthermore, the valves are administratively controlled by the associated test procedure while in the open position. Alignment of CS Pump suction to the Condensate Storage Tank is not required for safe shutdown or accident mitigation. These valves are not provided with position indication.

Test Requirement(s):

No test requirements

Reference(s):

1. UFSAR Section 6.3.2.2.3, Core Spray System
2. Design Baseline Document L-S-44, Core Spray System

System (No): Core Spray (CS) System (52)

Component Description: CS Pump Discharge Check Valve

ID Nos.: 52-1F003A, 52-1F003B, 52-1F003C, 52-1F003D
52-2F003A, 52-2F003B, 52-2F003C, 52-2F003D

P&ID/COORD (respectively): M-52 (SHT 2) / D-6, D-3, D-5, D-1,
M-52 (SHT 4) / D-6, D-3, D-5, D-1

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 12.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety OC Failsafe -

Test Frequency (Direction): ET-Q(F&R) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The CS Pump discharge check valves perform active safety functions in the open and closed positions.

These valves must be capable of opening to allow passage of Core Spray injection flow upon CS Pump initiation. Each CS Pump is required to provide a minimum of 3175 gpm in order to provide 50% of required system flow in the event of a LOCA.. Therefore, each check valve must be capable of passing at least 3175 gpm to perform its safety function.

In the closed position, these valves prevent gross diversion of CS Pump flow through a possibly idle adjacent pump. Each CS loop is provided with two 50% capacity pumps in parallel. Failure of a check valve to close could result in the diversion of flow from the operating pump through the idle pump and back to the Suppression Pool. When closed, these valves also prevent the CS Pump discharge piping from draining back to the Suppression Pool. Drainage of this piping would result in a delay in the time required to initiate CS flow to the Reactor Vessel in the event of an accident and could result in a water hammer event due to the rapid acceleration of fluid in the line. The capability of these valves to fulfill this function is verified continuously during normal operation by the ability of the in-service keep-fill system to maintain the CS discharge lines filled and pressurized.

Test Requirement(s):

Quarterly exercise test to the open and closed positions

Reference(s):

1. LGS Technical Specification Table 3.2.2-2
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. UFSAR Section 6.3.2.2.3, Core Spray System
4. UFSAR Sections 7.3.1.1.1.3, CS System - Instrumentation and Controls
5. UFSAR Chapter 15, Accident Analysis
6. Design Baseline Document L-S-44, Core Spray System
7. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049

System (No): Core Spray (CS) System (52)

Component Description: CS Injection Manual Isolation Valve

ID Nos.: 52-1F007A, 52-1F007B, 52-2F007A, 52-2F007B

P&ID/COORD (respectively): M-52 (SHT 1) / E-7, F-7,
M-52 (SHT 3) / E-7, F-7

Code Class: 1 **Category:** B **Active/Passive:** P

Size: 12.00 **Valve Type:** GT **Act. Type:** MA

Positions: Normal LO Safety O Failsafe -

Test Frequency (Direction): PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally locked open manual maintenance isolation valves are located in each CS injection line to the Reactor Vessel. They have a passive safety function in the open position to allow CS flow to the Reactor Vessel in the event of a LOCA. These valves are equipped with position indication lights in the Control Room so that the position can be verified remotely.

These valves have no safety function in the closed position. They are locked open and inaccessible during normal operation, and are closed only to perform maintenance or leak rate testing on the CS injection check valves. Testing and maintenance are performed only when the CS System is not required to be operable.

Requirement(s):

Position indication verification at least once every 2 years

Reference(s):

1. T.S. 3/4.5, Emergency Core Cooling Systems
2. UFSAR Section 6.3.2.2.3, Core Spray System
3. UFSAR Chapter 15, Accident Analysis
4. Design Baseline Document L-S-44, Core Spray System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049

System (No): Core Spray (CS) System (52)

Component Description: Condensate Fill for CS Injection Line Check Valves

ID Nos.: 52-1F030A, 52-1F030B, 52-2F030A, 52-2F030B

P&ID/COORD (respectively): M-52 (SHT 1) / G-4, H-4,
M-52 (SHT 3) / G-4, H-4

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 2.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_C_ Failsafe_-_

Test Frequency (Direction): DI-P6, PT-DI @ **Appendix J, Type C:** N

VRR/VCS/ROJ: GVROJ-1

Remarks: Refueling outage justification GVROJ-1 documents operability verification of these check valves by sample disassembly and inspection per GL 89-04 Position 2.

Safety Function(s): These downstream, in-series check valves are located in keepfill injection lines to the CS System. They have an active safety function in the closed position to prevent diversion of CS injection flow to the non-safety related, non-seismic Condensate Transfer System. The capability of these valves to fulfill their required function is confirmed by sample disassembly and inspection as documented in GVROJ-1. Disassembly and inspection is recognized as a positive means of verifying individual valve operability per NRC Generic Letter 89-04, Position 2. Therefore, since these valves have no safety function to open and only one valve in each pair is required to be capable of closure, and since no safety analysis requires a two valve configuration for this application, only these valves are included in the IST Program. The upstream valves are considered to have no safety design basis, thus no safety function, and are therefore outside the scope of the Program.

The valves do not perform a safety function in the open position. During normal plant operation, they are open to allow the Condensate Transfer System to maintain ECCS injection lines full in order to minimize system response times and water hammer potential. Although this function is essential for maintaining the ECCS in a standby condition, the ASME Safety Class 2 Safeguard Piping Fill System is credited with performing this function.

Test Requirement(s):

Verification of valve operability to the closed position by sample disassembly during refueling outages or associated system outages.

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. UFSAR Section 6.3.2.2.3, Core Spray System
3. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
4. UFSAR Sections 7.3.1.1.1.3, CS System - Instrumentation and Controls
5. UFSAR Chapter 15, Accident Analysis
6. Design Baseline Document L-S-44, Core Spray System
7. NRC Generic Letter (GL) 89-04, Supplement 1, Guide on Developing Acceptable Inservice Testing Programs, Position 2
8. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 4.1.1
9. ECR LG 95-00862 Rev. 0

System (No): Core Spray (CS) System (52)

Component Description: CS Pump Minimum Flow Check Valve

ID Nos.: 52-1F036A, 52-1F036B, 52-1F036C, 52-1F036D, 52-2F036A, 52-2F036B, 52-2F036C, 52-2F036D

P&ID/COORD (respectively): M-52 (SHT 2) / D-7, D-3, D-5, D-1, M-52 (SHT 4) / D-7, D-3, D-5, D-1

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 3.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_O_ Failsafe_-_

Test Frequency (Direction): ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The CS Pump minimum flow check valves perform an active safety function in the open position. The valves must be capable of passing sufficient flow to protect their associated CS Pump from overheating when operating under low flow or shutoff head conditions. The min-flow check valves must pass a minimum of 320 gpm to perform their safety function in the open position. However, controls for the min-flow isolation valves, HV-52-1(2)F031A and B, are set to establish minimum flow when the associated pump is operating at less than 775 gpm.

These check valves do not perform a safety function in the closed position. They are located in lines which penetrate primary containment. However, the min-flow recirculation line terminates below minimum Suppression Pool water level. The isolation provisions for this line consist of a Suppression Pool water seal and one isolation valve outside of containment.

Requirement(s):

Quarterly exercise test to the open position.

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.3.2.2.3, Core Spray System
4. UFSAR Section 6.2.3.2.3.1, Water Seals
5. Design Baseline Document L-S-44, Core Spray System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049

System (No): Core Spray (CS) System (52)

Component Description: CS Loop B Injection Check Valves - Outboard PCIV/PIVs

ID Nos.: HV-52-108, HV-52-208

P&ID/COORD (respectively): M-52 (SHT 1) / F-6, M-52 (SHT 3) / F-6

Code Class: 1 **Category:** A/C **Active/Passive:** A

Size: 12.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_C_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): ET-R(F&R), LJ-B, LP-T, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 52-ROJ-1

Remarks: Refueling outage justification 52-ROJ-1 allows deferral of valve exercise testing to refueling due to the valves performing a high to low pressure boundary function, and the inability of the attached air operator to open the valve without the presence of flow.

Safety Function(s): These normally closed loop "B" outboard injection check valves perform active safety functions in the open and closed positions.

These valves must be capable of opening upon system actuation to allow CS loop "B" injection flow to a depressurized Reactor Vessel at a minimum rate of 7000 gpm during long term cooling following a LOCA. Additionally, the HPCI system directs a maximum of 3000 gpm to the Reactor Vessel via CS loop "B" during small break LOCA conditions.

These valves are identified in UFSAR Tables 6.2-17 & 6.2.25 as outboard primary containment isolation valves for Penetration X-16B, and in T.S. Table 3.4.3.2-1 as Reactor Coolant pressure boundary isolation valves,. As such, they also perform an active safety function in the closed position to maintain containment integrity, and to provide a high to low pressure boundary isolation between the Reactor Coolant and Core Spray Systems. These valves require seat leakage testing for verification of leak tight integrity as both PCIVs and RCPBIVs.

Test Requirement(s):

Exercise test to the open and closed positions during refueling
Position indication verification once every two years
Seat leakage rate test once every two years (for RCPBIV function)
Seat leakage rate test per 10 CFR 50, Appendix J (Option B) (for PCIV function)

Reference(s):

1. LGS Technical Specification Table 3.4.3.2-1
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 6.2.4, Containment Isolation System
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 6.3.2.2.3, Core Spray System
7. UFSAR Sections 7.3.1.1.1.3, CS System - Instrumentation and Controls
8. UFSAR Chapter 15, Accident Analysis
9. Design Baseline Document L-S-44, Core Spray System
10. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049

System (No): Core Spray (CS) System (52)

Component Description: Suppression Pool Cleanup Pump Suction Supply Isolation Valves -Inboard/Outboard PCIVs

ID Nos.: HV-52-127, HV-52-128, HV-52-227, HV-52-228

P&ID/COORD (respectively): M-52 (SHT 2) / G-7, G-7, M-52 (SHT 4) / G-7, G-7

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 6.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_OC_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These valves perform an active safety function in the closed position. They are identified in UFSAR Tables 6.2-17 & 6.2.25 as primary containment isolation valves for Penetration X-237. As such, they must be capable of automatic closure upon receipt of a Group VIIIB isolation signal to maintain containment integrity. These valves require seat leakage testing for verification of leak tight integrity. However, due to the presence of a water seal, valve seat leakage is not required to be counted against the $0.6L_a$ containment leak rate limit. These valves have a maximum isolation time of 60 seconds.

These valves do not perform a safety function in the open position. The Suppression Pool Cleanup System is used when needed during normal plant operations and shutdowns to maintain Suppression Pool level and water quality.

The valve motor operators are powered from separate Class 1E ac emergency buses to ensure isolation capability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.3-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 6.2.3.2.3.1, Water Seals
6. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Core Spray (CS) System (52)

Component Description: Suppression Pool Level Instrumentation Isolation Valve

ID Nos.: HV-52-139, HV-52-239

P&ID/COORD (respectively): M-52 (SHT 1) / A-7, M-52 (SHT 3) / A-7

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_O_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These valves provide isolation for Suppression Pool level transmitters LT-52-1(2)40B, and perform an active safety function in the closed position and a passive safety function in the open position.

These valves are identified in UFSAR Table 6.2-17 as containment isolation valves for Penetration X-237. As such, they must be capable of closure to maintain containment integrity and for long term leakage control. They do not receive an automatic isolation signal for containment isolation, but remain open to measure containment conditions post-LOCA. They close by remote manual switch actuation from the Control Room and would be required to close only in the event of the loss of the associated instrument loop. Once closed, there are no conditions which would require them to be reopened. They have a maximum isolation time of 45 seconds.

The piping for this penetration is considered an extension of the containment boundary since it must be available for long term usage following a design basis LOCA. As such, it is designed to the same quality standards as the primary containment. Leak tightness of the penetration is verified during the Type A test. Type C testing is not required.

These valves perform a passive safety function in the open position. Various components, important to safety, rely upon Suppression Pool level instrumentation to provide automatic actuation signals in order to accomplish their safety function. Also, accurate information regarding Suppression Pool level is important to enable the operator to perform certain required post-accident functions.

The valve operators receive their control power from the Class 1E ac emergency bus.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.3.7
2. LGS Technical Specification 3/4.6.3
3. UFSAR Table 6.2-17, Containment Penetration Data
4. UFSAR Section 6.3.2.2.3, Core Spray System
5. UFSAR Sections 7.3.1.1.1.3, CS System - Instrumentation and Controls
6. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
7. Design Baseline Document L-S-44, Core Spray System
8. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049

System (No): Core Spray (CS) System (52)

Component Description: CS Pumps Suction Supply from Suppression Pool - PCIVs

ID Nos.: HV-52-1F001A, HV-52-1F001B, HV-52-1F001C, HV-52-1F001D
HV-52-2F001A, HV-52-2F001B, HV-52-2F001C, HV-52-2F001D

P&ID/COORD (respectively): M-52 (SHT 1) / B-6, B-8, B-6, B-8,
M-52 (SHT 3) / B-6, B-8, B-6, B-8,

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 16.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_O_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These normally open CS pumps A,B,C and D suction supply valves from the Suppression Pool have an active safety function in the closed position, and a passive safety function in the open position.

These valves are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetrations X-206A,B,C & D. As such, they must be capable of closure by remote manual switch to maintain containment integrity These valves may also be required to close in the event of a break in the system that requires isolation of the Suppression Pool, or to provide long term leakage control. They have a maximum isolation time of 160 seconds.

In the open position, these keylocked open valves perform a passive safety function to provide suction to the CS Pumps from the Suppression Pool in order to allow the CS System to fulfill its required safety functions. In the event that closure of these valves is required, there are no conditions which would required that they be reopened. They receive no automatic actuation signals.

Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for this valve. Because the line penetration is below the minimum required Suppression Pool level, a water seal is maintained at all times following an accident. Therefore, Type C testing is not required.

The valve motor operators are powered from Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. LGS Technical Specification 3/4.6.3
3 UFSAR Section 6.2.3.2.3.1, Water Seals
4. UFSAR Section 6.2.4, Containment Isolation System
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 6.3.2.2.3, Core Spray System
7. UFSAR Sections 7.3.1.1.1.3, CS System - Instrumentation and Controls
8. Design Baseline Document L-S-44, Core Spray System
9. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049
10. LCR 95-13-0
11. ECR 96-00752 Rev. 0

System (No): Core Spray (CS) System (52)

Component Description: CS Loops A and B Outboard Discharge Isolation Valves

ID Nos.: HV-52-1F004A, HV-52-1F004B, HV-52-2F004A, HV-52-2F004B

P&ID/COORD (respectively): M-52 (SHT 1) / E-5, F-4,
M-52 (SHT 3) / E-5, F-4

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 12.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_OC_ Safety_O_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(O), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally open outboard injection isolation valves perform an active safety function in the open position to allow CS injection flow to the Reactor Vessel to mitigate the consequences of a LOCA. They open automatically, if not already open, upon receipt of a reactor low water level - Level 1 or high dry well pressure actuation signal coincident with a reactor low pressure signal. They must be capable of opening in sufficient time to support the 27 second system response time requirement. They are interlocked such that they cannot be closed when a CS System initiation signal is present. Additionally, they will not open automatically on a CS System initiation signal, when inboard injection valves 1(2)F005 and 1(2)F037 are being tested.

These valves do not perform a safety function in the closed position. They may be closed periodically to isolate the low pressure Core Spray System piping from higher pressure systems during testing of downstream isolation valves 1(2)F005 and 1(2)F037. However, 1(2)F005 will not be tested during power operation for reasons discussed in Cold Shutdown Justification 52-VCS-1.

The valve motor operators are powered from Class 1E ac emergency buses to ensure valve operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. UFSAR Section 6.3.2.2.3, Core Spray System
4. UFSAR Section 7.3.1.1.1.3, CS System - Instrumentation and Controls
5. Design Baseline Document L-S-44, Core Spray System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049

System (No): Core Spray (CS) System (52)

Component Description: CS Loop A Inboard Discharge Isolation Valve - Outboard PCIV/PIV

ID Nos.: HV-52-1F005, HV-52-2F005

P&ID/COORD (respectively): M-52 (SHT 1) / E-6, M-52 (SHT 3) / E-6

Code Class: 1 **Category:** A **Active/Passive:** A

Size: 12.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_C_ Safety_OC_ Failsafe_AI_

Test Frequency (Direction): ET-C, ST-C(O&C), LJ-B, LP-T, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 52-VCS-1

Remarks: Cold shutdown test justification 52-VCS-1 allows deferral of valve exercise testing due to the valves performing a high to low pressure boundary barrier function.

Safety Function(s): These normally closed CS System inboard injection isolation valves perform active safety functions in the open and closed positions.

These valves must be capable of opening to allow CS loop "A" injection flow to enter the Reactor Vessel to mitigate the consequences of a LOCA. They open automatically on receipt of a CS initiation signal of Reactor low water level - Level 1 or high drywell pressure coincident with Reactor low pressure. They are interlocked such that they cannot be opened by remote manual switch if 1(2)F004A is open and there is no initiation signal present. Additionally, they cannot be opened on a CS System initiation signal if 1(2)F004A or CS System initiation logic are being tested. They must be capable of opening in sufficient time to support the 27 second system response time requirement.

These valves are identified in UFSAR Tables 6.2-17 as primary containment isolation valves for penetration X-16A, and in T.S. Table 3.4.3.2-1 as Reactor Coolant pressure boundary isolation valves. As such, they perform active safety functions in the closed position to maintain containment integrity, and to provide a high to low pressure boundary between the Reactor Coolant and Core Spray Systems. They require seat leakage testing for verification of leak tight integrity as both PCIVs and RCPBIVs. They have a maximum isolation time of 18 seconds. However, they do not receive any automatic closure signals due to the necessity for the CS System to operate during post-accident conditions.

The valve motor operators are powered from Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Full stroke exercise test during cold shutdown
Stroke time test to the open and closed positions during cold shutdown
Position indication verification once every two years
Seat leakage rate test once every two years (for RCPBIV function)
Seat leakage rate test per 10 CFR 50, Appendix J (Option B) (for PCIV function)

Reference(s):

1. LGS Technical Specification Table 3.3.3-2
2. LGS Technical Specification Table 3.4.3.2-1
3. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
4. LGS Technical Specification 3/4.6.3
5. UFSAR Section 6.2.4, Containment Isolation System
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 6.3.2.2.3, Core Spray System
8. UFSAR Sections 7.3.1.1.1.3, CS System - Instrumentation and Controls
9. Design Baseline Document L-S-44, Core Spray System
10. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049

System (No): Core Spray (CS) System (52)

Component Description: CS Loops A and B Injection Check Valves - Inboard PCIV/PIVs

ID Nos.: HV-52-1F006A, HV-52-1F006B, HV-52-2F006A, HV-52-2F006B

P&ID/COORD (respectively): M-52 (SHT 1) / E-6, F-6,
M-52 (SHT 3) / E-6, F-6

Code Class: 1 **Category:** A/C **Active/Passive:** A

Size: 12.00 **Valve Type:** TC **Act. Type:** SA

Positions: Normal_C_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): ET-C(F&R), LJ-B, LP-T, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 52-VCS-1

Remarks: Cold shutdown test justification 52-VCS-1 allows deferral of valve exercise testing to cold shutdown due to the valves performing a high to low pressure boundary function.

Safety Function(s): These normally closed CS system loops "A" and "B" inboard injection testable check valves perform active safety functions in the open and closed positions.

These valves must be capable of opening upon system actuation to allow CS System injection flow to a depressurized Reactor Vessel at a minimum rate of 7000 gpm during long term cooling following a LOCA. Additionally, the HPCI system directs a maximum of 3000 gpm to the Reactor Vessel via CS loop "B" during small break LOCA conditions.

These valves are identified in UFSAR Table 6.2-17 as containment isolation valves for Penetrations X-16A and X-16B, and in T.S. Table 3.4.3.2-1 as Reactor Coolant pressure boundary isolation valves. As such, they perform active safety functions in the closed position to maintain containment integrity, and to provide a high to low pressure boundary between the Reactor Coolant and Core Spray Systems. They require seat leakage testing for verification of leak tight integrity as both PCIVs and RCPBIVs.

Test Requirement(s):

Exercise test to the open and closed positions during cold shutdowns
Position indication verification once every two years
Seat leakage rate test once every two years (for RCPBIV function)
Seat leakage rate test per 10 CFR 50, Appendix J (Option B) (for PCIV function)

Reference(s):

1. LGS Technical Specification Table 3.4.3.2-1
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 6.2.4, Containment Isolation System
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 6.3.2.2.3, Core Spray System
7. UFSAR Sections 7.3.1.1.1.3, CS System - Instrumentation and Controls
8. UFSAR Chapter 15, Accident Analysis
9. Design Baseline Document L-S-44, Core Spray System
10. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049

System (No): Core Spray (CS) System (52)

Component Description: CS Pumps Full Flow Test Return Isolation Valve - PCIV

ID Nos.: HV-52-1F015A, HV-52-1F015B, HV-52-2F015A, HV-52-2F015B

P&ID/COORD (respectively): M-52 (SHT 1) / D-6, M-52 (SHT 1) / D-6, M-52 (SHT 3) / D-6, M-52 (SHT 3) / D-6

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 10.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_OC_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These normally closed motor-operated full flow test return isolation valves perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17as containment isolation valves for Penetrations X-207A & B. As such, they must be capable of automatic closure upon receipt of a CS initiation signal of Reactor Vessel low water level-Level 1 or high drywell pressure coincident with low reactor pressure, or by remote manual switch, to maintain containment integrity. They have a maximum isolation time of 23 seconds.

Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for these valves. Because the line penetration is below minimum required Suppression Pool level, a water seal is maintained at all times following an accident. Therefore, Type C testing is not required.

These valves do not perform a safety function in the open position. During inservice pump testing suction is supplied to the CS pumps from the suppression pool and is returned to the Suppression Pool via these valves. This is not a safety function.

The valve motor operators are powered from Class 1E ac emergency buses to ensure actuation capability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. LGS Technical Specification 3/4.6.3
3 UFSAR Section 6.2.3.2.3.1, Water Seals
4. UFSAR Section 6.2.4, Containment Isolation System
5. UFSAR Section 6.3.2.2.3, Core Spray System
6. UFSAR Sections 7.3.1.1.1.3, CS System - Instrumentation and Controls
7. UFSAR Chapter 15, Accident Analysis
8. Design Baseline Document L-S-44, Core Spray System
9. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049
10. LCR 95-13-0
11. ECR 96-00752 Rev. 0

System (No): Core Spray (CS) System (52)

Component Description: CS Pumps Minimum Flow Bypass Isolation Valve - PCIV

ID Nos.: HV-52-1F031A, HV-52-1F031B, HV-52-2F031A, HV-52-2F031B

P&ID/COORD (respectively): M-52 (SHT 1) / C-6, C-6,
M-52 (SHT 3) / C-6, C-6

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 4.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These normally-open motor-operated minimum flow isolation valves perform an active safety function in the closed position and a passive safety function in the open position.

In the open position, these valves prevent the CS Pumps from overheating due to the pump operating in a reduced flow or dead-headed condition. This is accomplished by initially directing pump flow to the Suppression Pool.

When flow transmitters FT-N051A&B sense a flow rate of > 775 gpm in the respective injection line, these valves are required to automatically close after a 3 second time delay, thereby directing full CS injection flow to the Reactor Vessel. Subsequent to closure, these valves would not be required to reopen for accident mitigation.

These valves are identified in UFSAR Table 6.2-17 as containment isolation valves for Penetrations X-235 and X-208B. As such, they must also be capable of closure by remote manual switch to maintain containment integrity. They do not receive any automatic isolation signals for containment isolation. However, UFSAR Table 6.2-17 identifies their safe shutdown and post accident positions as closed. They have a maximum isolation time of 45 seconds.

Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for these valves. Because the line penetration is below minimum required Suppression Pool Level, a water seal is maintained at all times following an accident. Therefore, Type C testing is not required.

The valve motor operators are powered from Class 1E ac emergency buses to ensure actuation capability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.3-2
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. LGS Technical Specification 3/4.6.3
4 UFSAR Section 6.2.3.2.3.1, Water Seals
5. UFSAR Section 6.2.4, Containment Isolation System
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 6.3.2.2.3, Core Spray System
8. UFSAR Section 7.3.1.1.1.3, CS System - Instrumentation and Controls
9. UFSAR Chapter 15, Accident Analysis
10. Design Baseline Document L-S-44, Core Spray System
11. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049
12. LCR 95-13-0
13. ECR 96-00752 Rev. 0

System (No): Core Spray (CS) System (52)

Component Description: CS Loop B Inboard Discharge Isolation Valves

ID Nos.: HV-52-1F037, HV-52-2F037

P&ID/COORD (respectively): M-52 (SHT 1) / F-5, M-52 (SHT 3) / F-5

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 12.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_C_ Safety_O_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(O), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed CS loop B inboard injection isolation valves perform an active safety function in the open position and a passive safety function in the closed position.

These valves must be capable of automatic actuation to the open position upon receipt of a CS initiation signal coincident with a Reactor low pressure permissive to allow CS injection flow into the Reactor Vessel. They must be capable of opening in sufficient time to support the 27 second system response time requirement.

These valves perform a passive safety function in the closed position to prevent diversion of HPCI flow in the event of a HPCI initiation. This function would not be required once a CS System initiation had occurred, since the low pressure permissive would prevent these valves from opening until the Reactor was depressurized. Therefore, these valves have no active safety function to close. Furthermore, they do not receive any automatic closure signals.

These valves are interlocked such that they cannot be opened by remote manual operation when outboard injection valves HV-52-1(2)F004B are open and no CS system initiation signal is present. Additionally, these valves cannot be automatically opened on a CS System initiation signal, if outboard injection valves 1(2)F004B or the CS System initiation logic are being tested.

The valve motor operators are powered from Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.3-2
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. UFSAR Section 6.3.2.2.3, Core Spray System
4. UFSAR Sections 7.3.1.1.1.3, CS System - Instrumentation and Controls
5. Design Baseline Document L-S-44, Core Spray System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049

System (No): Core Spray (CS) System (52)

Component Description: CS Loops A and B Injection Check Pressure Equalizing Valve - PCIV

ID Nos.: HV-52-1F039A, HV-52-1F039B, HV-52-2F039A, HV-52-2F039B

P&ID/COORD (respectively): M-52 (SHT 1) / E-6, M-52 (SHT 1) / F-6, M-52 (SHT 3) / E-6, M-52 (SHT 3) / F-6

Code Class: 1 **Category:** A **Active/Passive:** P

Size: 1.00 **Valve Type:** GL **Act. Type:** AO

Positions: Normal_C_ Safety_C_ Failsafe_C_

Test Frequency (Direction): LJ-B, LP-T, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed, air-operated isolation valves are located in the pressure equalizing lines around the CS injection testable check valves, F006A/B. They perform passive safety functions in the closed position. They are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetrations X-16A&B, and in T.S. Table 3.4.3.2-1 as Reactor Coolant pressure boundary isolation valves. As such, they perform passive safety functions in the closed position to maintain containment integrity, and to provide high to low pressure boundary isolation between the Reactor Coolant and Core Spray Systems. They require seat leakage testing for verification of leak tight integrity as both PCIVs and RCPBIVs. They have a maximum isolation time of 7 seconds. However, since they are not required to change position to accomplish their required functions, they do not require exercise testing. These normally closed valves are maintained in the closed position during all modes of plant operation when containment integrity is required and receive no automatic actuation signals.

These valves can be opened to allow pressure equalization across the disk of the testable injection check valves in order to perform periodic testing of the check valves using their air operators. However, as documented in cold shutdown justification 52-VCS-1, exercising the testable check valves during power operation would compromise the two valve isolation barrier between the Core Spray System and the Reactor Coolant System. The pressure equalizing valve is not required to open for CS injection. Therefore, these valves do not perform a safety function in the open position.

Test Requirement(s):

Position indication verification once every two years
Seat leakage rate test once every two years (for RCPBIV function)
Seat leakage rate test per 10 CFR 50, Appendix J (Option B) (for PCIV function)

Reference(s):

1. LGS Technical Specification Table 3.4.3.2-1
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 6.3.2.2.3, Core Spray System
6. UFSAR Section 7.3.1.1.1.3, CS System - Instrumentation and Controls
7. Design Baseline Document L-S-44, Core Spray System

System (No): Core Spray (CS) System (52)

Component Description: Suppression Pool Cleanup Pump Suction Supply Safety Relief Valve - PCIV

ID Nos.: PSV-52-127, PSV-52-227

P&ID/COORD (respectively): M-52 (SHT 2) / G-7, M-52 (SHT 4) / G-7

Code Class: 2 **Category:** A/C **Active/Passive:** A

Size: 0.75 **Valve Type:** RL **Act. Type:** SA

Positions: Normal C Safety OC Failsafe -

Test Frequency (Direction): RT-P3, LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These relief valves perform a safety function in the closed position for containment isolation. They are identified in UFSAR Tables 6.2-17 & 6.2.25 as containment isolation valves for Penetration X-237. As such, they must be capable of maintaining containment integrity.

These valves provide protection from overpressure which could build up in the isolated section of line between normally closed containment isolation valves HV-52-1(2)27 and HV-52-1(2)28. Integrity of the primary containment penetration is required to be maintained for accident mitigation. The Suppression Pool Cleanup System is normally not in service and the PCIV's are normally closed. ASME Section III, Article NC-7000 requires that individual components which can be isolated from the normal overpressure protection be protected. The requirement to provide overpressure protection of primary containment penetrations is also addressed in ANSI/ANS-56.2 and Generic Letter 96-06.

Test Requirement(s):

Relief valve test once every 10 years
Seat leakage testing per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. LGS Technical Specification Table 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 6.3.2.2.3, Core Spray System
6. UFSAR Section 7.3.1.1.1.3, CS System - Instrumentation and Controls
7. Design Baseline Document L-S-25A, Primary Containment Pressure Suppression System
8. Design Baseline Document L-S-44, Core Spray System

System (No): Core Spray (CS) System (52)

Component Description: Core Spray Loops A and B Discharge Thermal Relief Valves

ID Nos.: PSV-52-1F012A, PSV-52-1F012B, PSV-52-2F012A, PSV-52-2F012B

P&ID/COORD (respectively): M-52 (SHT 2) / F-7, F-3,
M-52 (SHT 4) / F-7, F-3

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 2.00 **Valve Type:** RL **Act. Type:** SA

Positions: Normal C Safety OC Failsafe -

Test Frequency (Direction): RT-P3 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): As required by ASME Section III, Article NC-7000, these relief valves protect the Core Spray Loop A and B discharge headers between the CS Pump discharge check valves and the injection isolation valves from overpressurization due to thermal expansion or leakage from the Reactor Coolant System. These portions of the CS System are maintained filled and pressurized by the Condensate Transfer System during normal conditions, or by the Safeguard Piping Fill System in the event that the Condensate Transfer System is unavailable. The integrity of these sections of the CS System is essential in assuring it will be capable of fulfilling its intended functions to mitigate the consequences of an accident, if required.

Test Requirement(s):

Relief valve test once every 10 years

Reference(s):

1. UFSAR Section 6.3.2.2.3, Core Spray System
2. Design Baseline Document L-S-44, Core Spray System
3. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052
4. LGS Modification 5010

System (No): Core Spray (CS) System (52)

Component Description: Core Spray Pumps Suction Supply Thermal Relief Valves

ID Nos.: PSV-52-1F032A, PSV-52-1F032B, PSV-52-1F032C, PSV-52-1F032D, PSV-52-2F032A, PSV-52-2F032B, PSV-52-2F032C, PSV-52-2F032D

P&ID/COORD (respectively): M-52 (SHT 2) / B-8, B-4, B-6, B-3, M-52 (SHT 4) / B-8, B-4, B-6, B-3

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 2.00 **Valve Type:** RL **Act. Type:** SA

Positions: Normal C Safety OC Failsafe -

Test Frequency (Direction): RT-P3 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These relief valves are installed in the Core Spray suction piping between the Core Spray Pumps and Suppression Pool suction isolation valves HV-52-1(2)F001A/B/C/D. During normal system alignment, overpressure protection is provided by design in that the design pressure of the piping is greater than the maximum pressure the piping will be subjected to. This method of overpressure protection is applicable when the system is in standby or operation. However, ASME Section III, Article NC-7000, also requires that individual components which can be isolated from the normal overpressure protection be protected. These valves provide overpressure protection for the Core Spray pump suction piping, Core Spray pump suction valves, and Safeguard Piping Fill Pump piping when the pump suctions are isolated from their supply source.

Test Requirement(s):

Relief valve test once every 10 years

Reference(s):

1. UFSAR Section 6.3.2.2.3, Core Spray System
2. Design Baseline Document L-S-44, Core Spray System
3. GE Operations and Maintenance Instruction, Vol. VII, Part 2, ECCS, GEK-97052
4. LGS Modification 5010

System (No): Core Spray (CS) System (52)

Component Description: Suppression Pool Level Instrumentation Isolation Valve

ID Nos.: SV-52-139, SV-52-239

P&ID/COORD (respectively): M-52 (SHT 1) / A-7, M-52 (SHT 3) / A-7

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** SO

Positions: Normal O Safety C Failsafe C

Test Frequency (Direction): ET-Q, ST-Q(C), FS-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These valves provide isolation for suppression pool level transmitters LT-52-1(2)40A, and perform an active safety function in the closed position and a passive safety function in the open position.

These valves are identified in UFSAR Table 6.2-17 as containment isolation valves for Penetration X-237. As such, they must be capable of closure to maintain containment integrity and for long term leakage control. They do not receive an automatic isolation signal for containment isolation, but remain open to measure containment conditions post-LOCA. They close by remote manual switch actuation from the Control Room and would be required to close only in the event of the loss of the associated instrument loop. Once closed, there are no conditions which would require them to be reopened. They have a maximum isolation time of 6 seconds.

The piping for this penetration is considered an extension of the containment boundary since it must be available for long term usage following a design basis LOCA. As such, it is designed to the same quality standards as the primary containment. Leak tightness of the penetration is verified during the Type A test. Type C testing is not required.

These valves perform a passive safety function in the open position. Various components, important to safety, rely upon Suppression Pool level instrumentation to provide automatic actuation signals in order to accomplish their safety function. Also, accurate information regarding Suppression Pool level is important to enable the operator to perform certain required post-accident functions. These valves do not receive automatic closure signals.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

These valves fail to the closed position on a loss of electric power. The valve operators receive their control power from the Class 1E ac emergency bus.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Quarterly fail-safe test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. LGS Technical Specification 3/4.3.7
3. UFSAR Table 6.2-17, Containment Penetration Data
4. UFSAR Section 6.3.2.2.3, Core Spray System
5. UFSAR Sections 7.3.1.1.1.3, CS System - Instrumentation and Controls
6. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
7. Design Baseline Document L-S-44, Core Spray System
8. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97049

System (No): Core Spray (CS) System (52)

Component Description: Excess Flow Check Valves for CS Injection Line Differential Pressure, PDT-1(2)N056 - PCIVs

ID Nos.: XV-52-1F018A, XV-52-1F018B, XV-52-2F018A, XV-52-2F018B

P&ID/COORD (respectively): M-52 (SHT 1) / G-6, G-6,
M-52 (SHT 3) / G-6, G-6

Code Class: 1 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** XC **Act. Type:** SA

Positions: Normal_O_ Safety_C_ Failsafe_-_

Test Frequency (Direction): ET-R(F), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: GVROJ-2

Remarks: Refueling outage justification GVROJ-2 allows functional testing of excess flow check valves to be performed at refueling.

Safety Function(s): Per Regulatory Guide 1.11 (Safety Guide 11), an excess flow check valve may satisfy the containment isolation criteria of 10CFR50, Appendix A (General Design Criteria 55 and 56). For instrument lines penetrating containment that are part of the protection system, excess flow check valves are acceptable provided the instrument sensing lines are sized or orificed such that in the event of a postulated piping or component failure (1) leakage is reduced to the maximum extent practical consistent with other safety requirements, (2) the rate and extent of coolant loss is within the capability of the reactor coolant makeup system, (3) the integrity and performance of the secondary containment and associated safety systems will be maintained and (4) the potential offsite exposure will be substantially less than 10CFR100 requirements.

These normally open, 1 inch excess flow check valves are located at Penetrations X-29B and X-48A-2. They have an active safety function to close in order to provide containment isolation and Reactor Coolant pressure boundary (RCPB) integrity. The UFSAR stipulates that instrument lines from the RCPB which penetrate the containment shall conform with Reg. Guide 1.11, which requires that they be equipped with a restricting orifice located inside the drywell, and an EFCV located outside and as close as practicable to the containment. In the event that an instrument line that communicates with the RCPB develops a leak outside the containment, a flow rate that results in a differential pressure across the valve of 3-10 psi causes the EFCV to close automatically. If an EFCV fails to close when required, the main flow path through the valve has a resistance to flow at least equivalent to a .375 inch diameter orifice.

These valves do not require Type C leak rate testing. The line does not isolate during a LOCA, and only leaks if the downstream check valves fail to seat. Leak tightness of the line is verified during the ILRT (Type A Test).

Test Requirements:

Exercise test in the forward direction during refueling outages
Position indication verification at least once every 2 years

References:

1. T.S. Table 3.6.3-1
2. UFSAR Section 6.2.4, Containment Isolation System
3. Regulatory Guide 1.11, Instrument Lines Penetrating Primary Reactor Containment
4. Design Baseline Document L-S-44, Core Spray System

SAFEGUARD PIPING FILL SYSTEM

System (No): Safeguard Piping Fill System (52)

Component Description: Safeguard Piping Fill Pumps

ID Nos.: 1AP256, 1BP256, 2AP256, 2BP256

P&ID/COORD (respectively): M-52 (SHT 2) / G-2, F-2,
M-52 (SHT 4) / G-2, F-2

Pump Type: Centrifugal **Test Parameters:** D/P, Q, V

Relief Request: GPRR-3

Remarks: Relief request GPRR-3 allows the use of ultrasonic flow measurement devices with an accuracy of ± 5% of reading in lieu of the ± 2% of full scale requirements of the Code.

Safety Function(s): The Safeguard Piping Fill System (SPFS) Pumps provide an ASME Safety Class 2, Seismic Category I backup source of keepfill water to the ECCS and RCIC Pump discharge lines in the event of a loss of the non-safety, non-seismic Condensate Transfer System. The SPFS Pumps perform an active safety function to maintain these lines full in order to ensure that the ECCS and RCIC Systems will satisfy their design response times by minimizing the lag time between the signal to start the pump and the initiation of flow into the Reactor Vessel and in order to prevent the possibility of water hammer that could result in significant dynamic loads when the ECCS/RCIC Pumps are started and flow is discharged into a partially filled line. The filled condition of the ECCS/RCIC lines is continuously monitored by level instrumentation. The SPFS Pumps also provide seal water to the Feedwater isolation valves to prevent leakage from the containment atmosphere into the Reactor enclosure in the event of any line break other than a Feedwater line break inside containment. These pumps are normally in standby and must be capable of starting by remote manual switch actuation. They do not receive any automatic initiation signals. The maximum flow rate required for the SPFS to perform its safety related function is undefined. The rated SPFS flow rate of 30 gpm is the combination of the minimum recirculation flow rate of 20 gpm and a maximum flow of 10 gpm to maintain the ECCS/RCIC lines filled.

Each SPFS pump is assigned to a separate Class 1E emergency ac division.

Test Requirement(s):

Quarterly pump testing

References:

1. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
2. UFSAR Section 7.1.2.1.41, Safeguard Piping Fill System
3. UFSAR Section 7.6.2.7, SPFS - Instrumentation and Controls
4. Design Baseline Document L-S-44, Core Spray System
5. LGS EWR L-00364, ECCS Operability if SPFS is Out of Service
6. GE SIL 375, Power Supply For Fill Systems

System (No): Safeguard Piping Fill System (52)

Component Description: SPFS Pump Discharge Check Valves

ID Nos.: 52-1051A, 52-1051B, 52-2051A, 52-2051B

P&ID/COORD (respectively): M-52 (SHT 2) / G-2, F-2
M-52 (SHT 4) / G-2, F-2

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.50 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety O Failsafe -

Test Frequency (Direction): ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks: SPFS series check valves which service the ECCS, RCIC and Feedwater are addressed in this Basis Document as part of the particular system with which they interface.

Safety Function(s): These check valves are located in the SPFS Pump discharge piping and perform an active safety function in the open position. They must be capable of opening upon remote manual initiation of the associated SPFS Pump in order to maintain the ECCS and RCIC discharge lines filled in the event of a loss of the Condensate Transfer System. They must also be capable of opening under post-accident conditions to provide a water seal to the Feedwater isolation valves in the event of any line break other than a Feedwater line break inside containment. These valves must be capable of passing a minimum of 10 gpm to accomplish their safety function, since they are located downstream of the recirc line branch connection.

These valves do not perform a safety function in the closed position. The two SPFS trains do not communicate; therefore, there is no possibility of the discharge flow from an inservice pump being diverted through an idle pump. Additionally, adequate isolation is provided at the interface between the SPFS and the applicable systems by two additional check valves in series, or by a check valve and a normally closed isolation valve.

Test Requirement(s):

Quarterly check valve exercise test to the open position

Reference(s):

1. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
2. UFSAR Section 7.1.2.1.41, Safeguard Piping Fill System
3. UFSAR Section 7.6.2.7, SPFS - Instrumentation and Controls
4. Design Baseline Document L-S-44, Core Spray System
5. LGS EWR L-00364, ECCS Operability if SPFS is Out of Service
6. GE SIL 375, Power Supply For Fill Systems

FUEL POOL COOLING AND CLEANUP (FPCC) SYSTEM

System (No): Fuel Pool Cooling and Cleanup (FPCC) System (53)

Component Description: Fuel Pool Cooling Pump

ID Nos.: 1AP211, 1BP211, 1CP211, 2AP211, 2BP211, 2CP211

P&ID/COORD (respectively): M-53 (SHT 2) / D-6, D-4, D-3,
M-53 (SHT 4) / D-6, D-4, D-3

Pump Type: Centrifugal **Test Parameters:** None

Relief Request: N/A

Remarks:

Safety Function: The Fuel Pool Cooling Pumps do not perform any active safety functions. The objective of the FPCC System is to remove decay heat from the Spent Fuel Storage Pool to ensure adequate cooling of irradiated stored assemblies. The Fuel Pool Cooling System also maintains Spent Fuel Pool water quality and clarity for the protection of personnel in the refueling area and for underwater operations. The Fuel Pool Cooling Pumps circulate water through the Fuel Pool Heat Exchangers and the Fuel Pool Filter/Demineralizer. The Fuel Pool Heat Exchangers transfer heat to the Service Water System.

Per NUREG-0800, Section 9.1.3, the FPCC System is not required to be a seismically qualified, Code Class (Quality Group C) system, provided the fuel pool makeup water system and its source, the fuel pool building and the fuel pool building ventilation and filtration systems, are Seismic Category I, are protected against tornadoes and are able to withstand a single active failure.

The Fuel Storage Pool is located inside the Reactor Building which is a Seismic Category I structure and is designed to withstand a design basis tornado. The Fuel Storage Pool is also Seismic Category I. The Standby Gas Treatment System is the seismic Category I filtration system for the Reactor Building atmosphere. The Secondary Containment System, which includes the Standby Gas Treatment System, is an engineered safety feature which is designed to limit the release of radioactive materials so that off-site doses will be below the values of 10 CFR 100 given a single active failure.

If normal fuel pool cooling is lost, heat can be removed by allowing the pool to boil and by adding makeup water to maintain the pool water level. Makeup water is normally supplied to the Skimmer Surge Tanks from the Demineralized Water Makeup System. If this Seismic Category IIA source is unavailable, makeup can be provided from the Ultimate Heat Sink (Spray Pond) by either of two Seismic Category I flow paths which consist of the ESW System and the RHRSW System. The preferred source is the ESW System via a cross-connecting line to one of the RHR System diffusers in the Spent Fuel Pool. The two ESW Pumps provide redundancy in motive power for this source of makeup supply. The manual valves which must be opened to initiate makeup from the ESW System are located in the Control Structure and are accessible after an accident. This design feature satisfies the commitment for compliance to NRC Regulatory Guides 1.13 and 1.25.

Fuel Pool Cooling Pumps A and B are powered from the Class 1E ac emergency power source to enhance operational reliability. However, since the FPCC System is not required to mitigate the consequences of an accident, bring the plant to a safe shutdown condition or maintain the plant in a safe shutdown condition, it is not included in the IST Program. The operability of the FPCC System is not required by LGS Technical Specifications.

Test Requirement(s):

No testing requirements.

References:

1. UFSAR Section 1.8, Conformance to NRC Regulatory Guidelines
2. UFSAR Section 7.7.1.14, FPCC System - Instrumentation and Controls
3. UFSAR Section 9.1.3, Fuel Pool Cooling and Cleanup System
4. UFSAR Table 9.1-3, Fuel Pool Cooling System Failure Modes and Effects Analysis
5. NUREG 0800 Standard Review Plan, Section 9.1.3
6. Regulatory Guide 1.13, Spent Fuel Storage Facility Design Basis, Rev. 1
7. Regulatory Guide 1.25, Assumptions Used for Evaluating Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling Water Reactors
8. System Design Baseline Document L-S-52, Fuel Pool Cooling and Cleanup System

System (No): Fuel Pool Cooling and Cleanup (FPCC) System (53)

Component Description: ESW to FPCC Crosstie Makeup Manual Valves

ID Nos.: 053-1093, 053-1094, 053-2093, 053-2094

P&ID/COORD (respectively): M-53 (SHT 1) / G-2 (Unit 1)
M-53 (SHT 3) / H-2 (Unit 2)

Code Class: 3 **Category:** B **Active/Passive:** A

Size: 2.00 **Valve Type:** GL **Act. Type:** MA

Positions: Normal C Safety O Failsafe -

Test Frequency (Direction): ET-Q **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-closed manual isolation valves are located in the ESW System crosstie to FPCC System. They perform an active safety function in the open position. They must be capable of manually opening to provide emergency makeup supply to the Spent Fuel Pool in the event of a complete loss of the FPCC System. Under these circumstances, fuel pool cooling would be accomplished by allowing the pool to boil and by adding makeup water from the Seismic Category I ESW System to maintain adequate pool water level.

In the closed position, these valves maintain separation between the ESW System and the Fuel Storage Pool. This is not a safety function.

Test Requirement(s):

Quarterly manual full-stroke exercising

References:

1. UFSAR Section 1.8, Conformance to NRC Regulatory Guidelines
2. UFSAR Section 7.7.1.14, FPCC System - Instrumentation and Controls
3. UFSAR Section 9.1.3, Fuel Pool Cooling and Cleanup System
4. UFSAR Table 9.1-3, Fuel Pool Cooling System Failure Modes and Effects Analysis
5. NUREG 0800 Standard Review Plan, Section 9.1.3
6. Regulatory Guide 1.13, Spent Fuel Storage Facility Design Basis, Rev. 1
7. Regulatory Guide 1.25, Assumptions Used for Evaluating Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling Water Reactors
8. System Design Baseline Document L-S-52, Fuel Pool Cooling and Cleanup System

HIGH PRESSURE COOLANT INJECTION (HPCI) SYSTEM

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: High Pressure Coolant Injection (HPCI) Pumps

ID Nos.: 1OP204, 2OP204

P&ID/COORD (respectively): M-56 (SHT 1) / F-5, M-56 (SHT 2) / F-5

Pump Type: Centrifugal **Test Parameters:** N, D/P, Q, V

Relief Request: GPRR-2

Remarks: Relief request GPRR-2 provides for exemption from individual instrument accuracy and full-scale range requirements provided the applicable instrument(s) are accurate to at least ± 6% at the reference value.

Safety Function(s): The High Pressure Coolant Injection (HPCI) System is part of the Emergency Core Cooling System (ECCS) and performs the safety function of providing sufficient coolant to the Reactor Vessel to prevent excessive fuel cladding temperatures in the event of a small-break LOCA, when rapid depressurization of the Vessel does not occur. The HPCI System also provides a backup for the RCIC System in the event RCIC fails. The HPCI System is designed to pump water into the Vessel while it is fully pressurized, and will provide adequate core cooling until Vessel pressure drops to the point at which LPCI or CS can be placed into operation. The HPCI system has automatic or remote manual starting capability to maintain or supplement Reactor Vessel coolant inventory so that the integrity of the fuel barrier is not compromised.

The HPCI System has a required accident flow rate of 5600 gpm, and injects via the Loop B CS System and Loop A Feedwater System piping. The system is required to provide design flow within 60 seconds upon receipt of a start signal. The normal supply source for the HPCI Pump is from the non-safety Condensate Storage Tank. Its secondary source is from the safety related Suppression Pool.

The HPCI System will initiate automatically upon receipt of either a reactor low water level-Level 2 or high drywell pressure signal. The system will automatically shut down when reactor vessel inventory reaches Level 8 high level.

Since the steam supply line to the HPCI system turbine is a primary containment boundary, a HPCI system auto isolation occurs upon receipt of any of the following signals:

- Low steam supply pressure
- HPCI steam line delta pressure high
- HPCI equipment room temperature high
- HPCI equipment room delta temperature high
- HPCI pipe routing area temperature high
- HPCI steam line delta pressure timer
- High turbine exhaust diaphragm pressure
- Low pump suction pressure
- Turbine overspeed
- High turbine exhaust pressure

The HPCI System is classified as Safety Class 2, Seismic Category I. The system is capable of startup and limited operation following a DBA event independent of ac power. The use of station batteries from the Class 1E system supports the HPCI design requirements.

Test Requirement(s):

Quarterly pump testing.

References:

1. LGS Technical Specification Tables 3.3.2-2, 3.3.3-2 and 3.3.3-3
2. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
3. UFSAR Section 6.3, Emergency Core Cooling Systems
4. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
5. UFSAR Section 7.3.1.1.1.1, High Pressure Coolant Injection System - Instrumentation and Controls
6. UFSAR Chapter 15, Accident Analysis
7. Design Baseline Document L-S-03, High Pressure Coolant Injection System
8. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Turbine Exhaust Line Vacuum Breakers

ID Nos.: 55-1025, 55-1026, 55-1F080, 55-1F094
55-2025, 55-2026, 55-2F080, 55-2F094

P&ID/COORD (respectively): M-55 (SHT 1) / A-8, A-7, A-8, A-7
M-55 (SHT 2) / A-8, A-7, A-8, A-7

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 4.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): ET-Q(F&R) **Appendix J, Type C:** N

VRR/VCS/ROJ: GVRR-5

Remarks: Relief request GVRR-5 allows these series-parallel check valves to be tested as a unit, rather than individually. The basis for use of this test method is described NUREG-1482, Section 4.1.1.

Safety Function(s): The HPCI turbine exhaust line vacuum breakers perform an active safety function in both the open and closed positions.

These valves open to prevent siphoning of water from the Suppression Pool into the HPCI turbine exhaust line caused by the condensation of steam following system isolation. This is accomplished by admitting air from the containment free space to the turbine exhaust line when negative pressure within the line reaches a point where the vacuum breakers open. The vacuum breakers are designed to open with a pressure differential of < 0.5 psid across the seat. Failure of these valves to open could cause a pressure spike in the turbine exhaust piping upon system restart, resulting in a turbine trip and rendering the system inoperable.

In the closed position, these valves prevent the diversion of unquenched HPCI turbine exhaust steam into the Suppression Chamber atmosphere. Quenching of the exhaust steam by directing it below the surface of the Suppression Pool is necessary to limit the increase in Suppression Pool temperature and pressure in the Suppression Chamber. Failure of these valves to close could result in an increase in Suppression Chamber pressure or pool temperature to the point of exceeding Technical Specification limits or containment vessel design limits.

Test Requirement(s):

Quarterly exercise test to the full open and closed positions.

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. UFSAR Section 6.3, Emergency Core Cooling Systems
3. UFSAR Section 7.3, Engineered Safety Features
4. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plant, Section 4.1.1.
5. Design Baseline Document L-S-03, High Pressure Coolant Injection System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: Safeguard Piping Fill Inlet Check Valves

ID Nos.: 55-1048, 55-1049, 55-2048, 55-2049

P&ID/COORD (respectively): M-55 (SHT 1) / D-4, C-4,
M-55 (SHT 2) / E-4, E-4

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.50 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety OC Failsafe -

Test Frequency (Direction): DI-P6, PT-DI @ **Appendix J, Type C:** N

VRR/VCS/ROJ: GVROJ-1

Remarks: Refueling outage justification GVROJ-1 documents operability verification of these check valves by sample disassembly and inspection per GL 89-04 Position 2.

Safety Function(s): The Safeguard Piping Fill supply check valves to the HPCI System perform active safety functions in the open and closed positions.

These valves must be capable of closure to prevent diversion of HPCI discharge flow to the SPFS, and to provide high to low pressure boundary isolation between the HPCI system and the lower design pressure piping of the safety related SPFS. Failure of these valves to close could compromise the ability of the HPCI System to fulfill its design safety function by allowing loss of HPCI flow through a possibly faulted line instead of flow being directed to the Reactor Vessel. Additionally, failure of these valves to close could render the Safeguard Piping Fill System inoperable due to overpressurization.

These valves also perform an active safety function in the open position. They must be capable of opening to allow flow from the SPFS to maintain the HPCI System piping in a solid state condition when the system is in standby. This is necessary for water hammer protection upon HPCI system initiation, and to support the HPCI system startup injection time requirement by minimizing the lag time between the signal to start the HPCI pump and the initiation of flow to the Reactor Vessel. Failure of these check valves to open could render both the HPCI and Safeguard Piping Fill Systems incapable of fulfilling their design safety functions.

The HPCI system stay fill level is continuously monitored to ensure the system is maintained in a solid state. In the event of a decline in system pressure, an alarm would alert the operator to take action to refill the system. There are no defined flow rate requirements specified for these valves.

Test Requirement(s):

Verification of valve operability to the open and closed positions by sample disassembly and inspection during refueling outages or associated system outages.

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. UFSAR Section 6.3, Emergency Core Cooling Systems
3. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
4. UFSAR Section 7.3, Engineered Safety Features
5. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plant, Appendix A, Position 2
6. Design Baseline Document L-S-03, High Pressure Coolant Injection System
7. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
8. ECR LG 95-00862 Rev. 0

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Injection Check Valves to Feedwater and Core Spray

ID Nos.: 55-1058, 55-1059, 55-2058, 55-2059

P&ID/COORD (respectively): M-55 (SHT 1) / F-4, D-5,
M-55 (SHT 2) / F-4, D-5

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 8.00 [1(2)058]
12.00 [1(2)059] **Valve Type:** CK **Act. Type:** SA

Positions: Normal C Safety O Failsafe -

Test Frequency (Direction): DI-R, PT-DI@ **Appendix J, Type C:** N

VRR/VCS/ROJ: 55-ROJ-2

Remarks: Refueling outage justification 55-ROJ-2 documents operability verification of these check valves by disassembly and inspection on a refueling outage frequency due to the impracticality of other test methods.

Safety Function(s): These check valves are located in the HPCI injection lines to the Core Spray and Feedwater Systems. They perform an active safety function in the open position to allow HPCI injection flow to the Reactor Vessel. The minimum required HPCI System flow rate is 5600 gpm. A maximum of 45 % (2520 gpm) is directed to Core Spray Loop B via 1(2)059. The remaining 55 % (3080 gpm) is directed through injection check 1(2)058 to Loop A of the Feedwater System.

These check valves do not perform a safety function in the closed position. Motor operated gate valves located immediately upstream of each check valve are interlocked to remain closed any time the HPCI pump/turbine is in a standby or isolated condition. Therefore, the motor operated valves provide adequate isolation capability between the HPCI System and the interface to its injection flow paths.

Test Requirement(s):

Exercise testing to the fully open position by disassembly and inspection each refueling outage.

Reference(s):

1. UFSAR Section 6.3, Emergency Core Cooling Systems
2. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
3. UFSAR Section 7.3, Engineered Safety Features
4. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plant, Appendix A, Position 2
5. Design Baseline Document L-S-03, High Pressure Coolant Injection System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
7. ECR LG 95-00862 Rev. 0

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Pump Discharge Check Valve

ID Nos.: 55-1F005, 55-2F005

P&ID/COORD (respectively): M-55 (SHT 1) / D-4, M-55 (SHT 2) / D-4

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 14.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety O Failsafe -

Test Frequency (Direction): ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The HPCI Pump discharge check valves perform an active safety function in the open position. These valves must be capable of opening to provide a HPCI injection flow path to the Reactor Vessel. The HPCI System has a maximum required flow rate of 5600 gpm in order to prevent the Reactor Vessel core from being uncovered during a worst-case small break LOCA. Therefore, these check valves must be capable of passing a minimum of 5600 gpm in order to perform their safety function in the open direction.

This check valve does not perform a safety function in the closed position. When the HPCI system is in a standby condition the check valve is closed to allow the HPCI pump discharge piping to be maintained in a solid state. Failure of the check valve to properly close would result in a high pump suction pressure alarm in the main control room as sensed by PIS-56-1(2)N652 with a setpoint of 70 psig.

Test Requirement(s):

Quarterly exercise test to the full open position.

Reference(s):

1. UFSAR Section 6.3, Emergency Core Cooling Systems
2. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
3. UFSAR Section 7.3, Engineered Safety Features
4. Design Baseline Document L-S-03, High Pressure Coolant Injection System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Pump Suction Supply Check Valves From the CST and Suppression Pool

ID Nos.: 55-1F019, 55-1F045, 55-2F019, 55-2F045

P&ID/COORD (respectively): M-55 (SHT 1) / F-3, M-55 (SHT 1) / B-6, M-55 (SHT 2) / F-3, M-55 (SHT 2) / B-6

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 16.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_O_ Failsafe_-_

Test Frequency (Direction): ET-Q(F)/(F019) PT-Q, DI-R, PT-DI@ (F045) **Appendix J, Type C:** N

VRR/VCS/ROJ: 55-ROJ-1 (F045)

Remarks: Refueling outage justification 55-ROJ-1 documents the reasons for the selection of disassembly and inspection on a refueling outage frequency as the test method for the Suppression Pool suction check valves (F045).

Safety Function(s): The HPCI Pump suction check valves from the Condensate Storage Tank (CSTs) and the Suppression Pool perform an active safety function in the open position. Each of these valves must be capable of opening and passing a minimum required flow of 5600 gpm, when the applicable source is selected to provide suction to the HPCI Pump.

These check valves do not perform a safety function in the closed position. Motor operated isolation valves 1(2)F004 and 1(2)F042 are located upstream of the check valves and are provided with interlocks which prevent both isolation valves from remaining in the open position simultaneously. These interlocks provide reasonable assurance that separation will be maintained between suction supply sources, thereby ensuring NPSH availability.

Test Requirement(s):

Quarterly full stroke exercise test (F019).
Quarterly partial exercise test to the open position (F045)
Exercise test to the full open position during refuelings (F045)

Reference(s):

1. LGS Technical Specification Tables 3.3.2-2, 3.3.3-2 and 3.3.3-3
2. UFSAR Section 6.3, Emergency Core Cooling Systems
3. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
4. UFSAR Section 7.3, Engineered Safety Features
5. Design Baseline Document L-S-03, High Pressure Coolant Injection System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
7. ECR LG 95-00862 Rev. 0

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Turbine Exhaust Line Stop/Check Valve

ID Nos.: 55-1F021, 55-2F021

P&ID/COORD (respectively): M-55 (SHT 1) / C-4, M-55 (SHT 2) / C-4,

Code Class: 2 (1F021) NC (2F021) **Category:** C **Active/Passive:** A

Size: 12.00 **Valve Type:** SK **Act. Type:** SA

Positions: Normal OC Safety O Failsafe -

Test Frequency (Direction): ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The HPCI Turbine exhaust to Suppression Pool stop check valves perform an active safety function in the open position. They must be capable of opening to route the maximum expected exhaust steam to the Suppression Pool when the HPCI Pump is operating at rated flow of 5670 gpm. Failure of the valve to go to the full open position during HPCI Turbine/Pump operation could create excessive back pressure in the exhaust line resulting in an isolation signal to the HPCI system, thereby rendering the system inoperable.

These valves do not perform a safety function in the closed position. The exhaust line does penetrate primary containment. However, containment isolation is provided by the suppression pool water seal and a power operated outboard containment isolation valve.

Test Requirement(s):

Quarterly exercise test to the open position.

Reference(s):

1. LGS Technical Specification Tables 3.3.2-2, 3.3.3-2 and 3.3.3-3
2. LGS Technical Specification 3/4.6.3
3. UFSAR Table 6.2-17, Containment Penetration Data
4. UFSAR Section 6.3, Emergency Core Cooling Systems
5. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
6. UFSAR Section 7.3, Engineered Safety Features
7. Design Baseline Document L-S-03, High Pressure Coolant Injection System
8. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Pump Minimum Flow Bypass to Suppression Pool

ID Nos.: 55-1F046, 55-2F046

P&ID/COORD (respectively): M-55 (SHT 1) / C-3, M-55 (SHT 2) / C-3

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 4.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety O Failsafe -

Test Frequency (Direction): ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The HPCI Pump minimum flow bypass line check valve performs an active safety function in the open position. The valve must be capable of opening to prevent the HPCI pump from being damaged by overheating due to the pump operating in a dead-headed condition. The minimum required flow through the pump is 560 gpm. Therefore, this check valve must be able to pass a minimum of 560 gpm in order to perform its safety function.

This check valve does not perform a safety function in the closed position. The minimum flow bypass line penetrates primary containment at Penetration X-236 with no other process line branch connections downstream of the check valve. The containment isolation provisions for this line consist of a Suppression Pool water seal, an isolation valve outside of containment and a closed system outside of containment.

Test Requirement(s):

Quarterly exercise test to the full open position.

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Table 6.2-17, Containment Penetration Data
3. UFSAR Section 6.3, Emergency Core Cooling Systems
4. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
5. UFSAR Section 7.3, Engineered Safety Features
6. Design Baseline Document L-S-03, High Pressure Coolant Injection System
7. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: Fill From Condensate Transfer to HPCI Pipe

ID Nos.: 55-1F077, 55-1F078, 55-2F077, 55-2F078

P&ID/COORD (respectively): M-55 (SHT 1) / B-5, B-5,
M-55 (SHT 2) / B-5, B-5

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 2.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety C Failsafe -

Test Frequency (Direction): DI-P6, PT-DI@ **Appendix J, Type C:** N

VRR/VCS/ROJ: GVROJ-1

Remarks: Refueling outage justification GVROJ-1 documents operability verification of these check valves by sample disassembly and inspection per GL 89-04 Position 2.

Safety Function(s): Safety Function(s): These series check valves are located in the Condensate Transfer System (CTS) supply line to HPCI Pump discharge pipe. They perform an active safety function in the closed position to prevent diversion of HPCI discharge flow to the CTS. They also provide high to low pressure boundary isolation between the Class 2 HPCI System and the lower design pressure non-Code, non-seismic Condensate Transfer System. Failure of these valves to close could compromise the ability of the HPCI system to fulfill its design safety function by allowing loss of HPCI flow through a possibly faulted line instead of flow being directed to the Reactor Vessel.

These valves do not perform a safety function in the open position. During normal plant operation the CTS is used to maintain the ECCS lines full. The non-Code, non-seismic CTS, however, cannot be credited with the capability of fulfilling this safety function and it is therefore assigned to the Safeguards Piping Fill System (SPFS).

Test Requirement(s):

Verification of valve operability to the closed position by sample disassembly and inspection during refueling outages or associated system outages.

Reference(s):

1. LGS Technical Specifications 3/4.5.1 and 3/4.5.2
2. UFSAR Section 6.3, Emergency Core Cooling Systems
3. UFSAR Section 6.3.2.2.6, Safeguard Piping Fill System
4. UFSAR Section 7.3, Engineered Safety Features
5. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plant, Appendix A, Position 2
6. Design Baseline Document L-S-03, High Pressure Coolant Injection System
7. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
8. ECR LG 95-00862

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: Suppression Pool Level Instrumentation Isolation Valves

ID Nos.: HV-55-120, HV-55-121, HV-55-126, HV-55-220, HV-55-221

P&ID/COORD (respectively): M-55 (SHT 1) / B-6, B-6, A-6
M-55 (SHT 2) / B-6, B-6

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 2.00 [1(2)20, 221]
0.75 [121, 126] **Valve Type:** GL **Act. Type:** MO

Positions: Normal_O_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These valves provide isolation for Suppression Pool level transmitters, and perform an active safety function in the closed position and a passive safety function in the open position.

These valves are identified in UFSAR Table 6.2-17 (excluding 126) as containment isolation valves for penetration X-219A&B. As such, they must be capable of closure to maintain containment integrity and for long term leakage control.. They do not receive an automatic isolation signal for containment isolation, but remain open to measure containment conditions post-LOCA. They close by remote manual switch actuation from the Control Room and would be required to close only in the event of the loss of the associated instrument loop. Once closed, there are no conditions which would require them to be reopened. They have a maximum isolation time of 45 seconds.

The piping for this penetration is considered an extension of the containment boundary since it must be available for long term usage following a design basis LOCA. As such, it is designed to the same quality standards as the primary containment. Leak tightness of the penetration is verified during the Type A test. Type C testing is not required.

These valves perform a passive safety function in the open position. Various components, important to safety, rely upon Suppression Pool level instrumentation to provide automatic actuation signals in order to accomplish their safety function. Also, accurate information regarding Suppression Pool level is important to enable the operator to perform certain required post-accident functions.

On Unit 1, HV-55-126 provides isolation for the reference leg to LT-55-141 from penetration X-219A. On Unit 2, the equivalent level transmitter, LT-52-241, is installed in parallel with LT-52-240A, both of which are isolated by HV-55-221. Although omitted from UFSAR Table 6.2-17, HV-55-126 has the same safety function requirements as HV-55-121 and HV-55-221.

The valve operators receive their control power from the Class 1E ac emergency bus.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.3.7
2. LGS Technical Specification 3/4.6.3
3. UFSAR Table 6.2-17, Containment Penetration Data
4. UFSAR Section 6.3, Emergency Core Cooling Systems
5. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
6. UFSAR Section 7.3, Engineered Safety Features
7. Design Baseline Document L-S-03, High Pressure Coolant Injection System
8. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
9. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
10. Functional Control Diagram 8031-M1-E41-1030-F

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Turbine Steam Supply Isolation Valves

ID Nos.: HV-55-1F001, HV-55-2F001

P&ID/COORD (respectively): M-55 (SHT 1) / D-2, M-55 (SHT 2) / D-2

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 12.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_C_ Safety_OC_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(O&C) PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed, motor-operated steam supply valves perform active safety functions in the open and closed positions.

The active safety function in the open position is to provide steam supply to the HPCI Turbine. These valves must be capable of opening upon receipt of a HPCI System actuation signal of Reactor low water level-Level 2 or high drywell pressure when steam exhaust isolation valve, F072, is fully open. They must open within 20 seconds to ensure the HPCI System can attain its design flow rate within 60 seconds of receipt of an initiation signal.

These valves perform an active safety function in the closed position and must be capable of closure by remote manual switch actuation when the HPCI System is placed in the standby mode. This function allows steam pressure to be maintained in the steam supply piping, which keeps the piping at an elevated temperature to ensure the system can be brought to design flow within 60 seconds from receipt of an initiation signal. These valves do not receive any automatic closure signal.

The valve motor operators are powered from Division II of the Class 1E dc power system to assure valve operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. UFSAR Section 6.3, Emergency Core Cooling Systems
2. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
3. UFSAR Section 7.3.1.1.1.1, High Pressure Coolant Injection System - Instrumentation and Controls
4. Design Baseline Document L-S-03, High Pressure Coolant Injection System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Main Steam Supply Inboard and Outboard PCIVs

ID Nos.: HV-55-1F002, HV-55-1F003,
HV-55-2F002, HV-55-2F003

P&ID/COORD (respectively): M-55 (SHT 1) / F-6, M-55 (SHT 1) / F-6,
M-55 (SHT 2) / F-6, M-55 (SHT 2) / F-6

Code Class: 1 **Category:** A **Active/Passive:** A

Size: 10.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_O_ Safety_OC_ Failsafe_AI_

Test Frequency (Direction): ET-C, ST-C(O&C) (F002),
ET-Q, ST-Q(O&C) (F003)
LJ-B, PI-T

Appendix J, Type C: Y

VRR/VCS/ROJ: 55-VCS-1 (F002 Only)

Remarks: Cold shutdown justification 55-VCS-1 allows deferred exercise testing of F002, due to its location inside the drywell.

Safety Function(s): These normally open, motor-operated HPCI main steam supply inboard and outboard PCIVs perform active safety functions in both the open and closed positions.

These valves are identified in UFSAR Table 6.2-17 as containment isolation valves for Penetration X-11. As such, they must be capable of closure to provide containment integrity when necessary. However, they do not receive any automatic containment isolation signals in order to assure that the HPCI System will be available if required. Instead, the HPCI System has its own isolation logic, which isolates HPCI in the event of a fault within the system. Initiation of a HPCI isolation signal will occur as a result of the following:

1) Low steam supply pressure
2) HPCI steam line delta pressure high
3) HPCI equipment room temperature high
4) HPCI equipment room delta temperature high

5) HPCI pipe routing area temperature high
6) High turbine exhaust diaphragm pressure

Initiation of any one of these signals could indicate a line break in the HPCI steam supply line. In that case, these valves would perform a containment isolation function by automatically isolating the Reactor Vessel from the faulted line condition.

These normally open valves also perform an active safety function in the open position to provide steam supply to the HPCI turbine. They receive no signals to automatically open. However, they may be required to reopen, by remote manual switch actuation, to re-establish HPCI System operation.

The valves have a maximum isolation time of 12 seconds. Control power is provided by separate Class 1E emergency ac buses, thereby ensuring isolation capability.

Test Requirement(s):

Quarterly full stroke exercise test (F003)
Quarterly stroke time test to the open and closed positions (F003)
Full stroke exercise test during cold shutdowns (F002)
Stroke time test to the open and closed positions during cold shutdowns (F002)
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 6.3, Emergency Core Cooling Systems
6. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
7. UFSAR Section 7.3, Engineered Safety Features
8. Design Baseline Document L-S-03, High Pressure Coolant Injection System
9. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Pump Suction Supply From the CST Isolation Valves

ID Nos.: HV-55-1F004, HV-55-2F004

P&ID/COORD (respectively): M-55 (SHT 1) / F-3, M-55 (SHT 2) / F-3

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 16.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal OC Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The HPCI Pump suction supply isolation valves from the CST perform active safety functions in the open and closed positions.

These normally open, motor-operated valves provide the primary suction supply source to the HPCI Pump. When the HPCI System is in standby, its suction is aligned to this non-safety related source. Suppression Pool water may not be of condensate quality. Therefore, it is preferred that it only be used if a source of condensate quality water is not available. When the HPCI System receives an initiation signal, these valves will automatically open, if closed, to ensure alignment to the CST when F041 and F042 are not fully open. This logic prevents draining the CST to the Suppression Pool. These valves must open in sufficient time to support the 60 second system respond time.

These valves perform an active safety function in the closed position to provide separation between the CST and the Suppression Pool. When the CST reaches low level (167.8 inches/2.3 feet indicated), the HPCI Pump Suppression Pool suction valves automatically open, at which point these valves automatically close.

These valves receive their control power from Division II of the Class 1E dc power system, and are capable of operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.3-2
2. UFSAR Section 6.3, Emergency Core Cooling Systems
3. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
4. UFSAR Section 7.3.1.1.1.1, High Pressure Coolant Injection System - Instrumentation and Controls
5. Design Baseline Document L-S-03, High Pressure Coolant Injection System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
7. Functional Control Diagram 8031-M1-E41-1030-F

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Pump Discharge Isolation Valve to Loop A of Core Spray

ID Nos.: HV-55-1F006, HV-55-2F006

P&ID/COORD (respectively): M-55 (SHT 1) / D-5, M-55 (SHT 2) / D-5

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 12.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal C Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally closed, motor-operated HPCI Pump discharge isolation valves to Loop B of the Core Spray System perform active safety functions in the open and closed positions.

These valves must be capable of automatically closing when the steam supply valve, F001, is fully closed. This feature ensures isolation between the CS System piping and the HPCI discharge piping when the HPCI System is in an isolated or standby condition, and establishes a boundary barrier to facilitate maintaining the HPCI discharge piping in a filled condition by the Safeguard Piping Fill System.

These valves must also be capable of automatic actuation to the open position on receipt of a HPCI initiation signal to direct flow to the Reactor Vessel. They are designed to open within 20 seconds to support the 60 second system response time.

These valves receive their control power from Division II of the Class 1E DC Power System, and are capable of operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. UFSAR Section 6.3, Emergency Core Cooling Systems
3. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
4. UFSAR Section 7.3.1.1.1.1, High Pressure Coolant Injection System - Instrumentation and Controls
5. Design Baseline Document L-S-03, High Pressure Coolant Injection System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Pump Discharge Outboard Isolation Valve

ID Nos.: HV-55-1F007, HV-55-2F007

P&ID/COORD (respectively): M-55 (SHT 1) / D-4, M-55 (SHT 2) / D-4

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 14.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal OC Safety O Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally open, motor-operated HPCI Pump discharge outboard isolation valves perform an active safety function in the open position. These valves will automatically open, if closed, on receipt of a HPCI initiation signal to provide an injection flow path to the Reactor Vessel. They are designed to open within 20 seconds to support the 60 second system response time.

These valves do not perform a safety function in the closed position. They were installed to provide redundant isolation capability for the HPCI System from the Feedwater and Core Spray Systems if downstream isolation valves, F105 or F006, are opened for testing. These valves close automatically when the portable test switch is into the J1 test jack and the pump discharge valve test override switch is in the F007 position. This feature prevents possible exposure of low pressure HPCI Pump suction piping to Feedwater pressure by maintaining a two valve isolation and provides redundant isolation between CS and HPCI.

These valves receive their control power from Division II of the Class 1E DC Power System, and are capable of operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. UFSAR Section 6.3, Emergency Core Cooling Systems
3. UFSAR Section 7.3.1.1.1.1, High Pressure Coolant Injection System - Instrumentation and Controls
4. Design Baseline Document L-S-03, High Pressure Coolant Injection System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Pump Full Flow Test Return to CST Isolation Valves

ID Nos.: HV-55-1F008, HV-55-2F008

P&ID/COORD (respectively): M-55 (SHT 1) / E-4, M-55 (SHT 2) / E-4

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 10.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_OC_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally closed, motor-operated HPCI Pump full flow test return to CST isolation valves perform an active safety function in the closed position. They must be capable of automatic closure upon receipt of a HPCI initiation signal, or whenever the HPCI injection valve to Core Spray, F006, is not fully closed in order to isolate the HPCI recirculation test circuit, and outside secondary containment, from the HPCI Pump discharge to the Reactor Vessel. These interlocks ensure that the valves will automatically close if a HPCI initiation is required while a pump test is in progress. They must be capable of closure within sufficient time to support the HPCI System response time of 60 seconds.

These valves do not receive an automatic open signal and do not perform a safety function in the open position. They are opened/throttled only during HPCI Pump operability testing.

These valves receive their control power from Division II of the Class 1E DC Power System, and are capable of operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.3-2
2. UFSAR Section 6.3, Emergency Core Cooling Systems
3. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
4. UFSAR Section 7.3.1.1.1.1, High Pressure Coolant Injection System - Instrumentation and Controls
5. Design Baseline Document L-S-03, High Pressure Coolant Injection System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
7. Functional Control Diagram 8031-M1-E41-1030-F

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI/RCIC Pump Full Flow Test Return to CST Isolation Valves

ID Nos.: HV-55-1F011, HV-55-2F011

P&ID/COORD (respectively): M-55 (SHT 1) / G-4, M-55 (SHT 2) / G-4

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 10.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally closed, motor-operated HPCI/RCIC Pump full flow test return to CST isolation valves perform an active safety function in the closed position. They must be capable of automatic closure upon receipt of a HPCI initiation signal in order to prevent diversion of HPCI or RCIC injection flow away from the Reactor Vessel. They are also interlocked to close whenever the HPCI or RCIC Pump suction supply valves from the Suppression Pool are fully open in order to minimize the amount of Suppression Pool inventory that can flow to the CST and therefore outside of secondary containment. They must be capable of closure within sufficient time to support the HPCI System response time of 60 seconds.

These valves do not receive an automatic open signal and do not perform a safety function in the open position. They are opened only for periodic surveillance testing of the HPCI or RCIC Pumps.

These valves receive their control power from Division II of the Class 1E DC Power System, and are capable of operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.3-2
2. UFSAR Section 6.3, Emergency Core Cooling Systems
3. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
4. UFSAR Section 7.3.1.1.1.1, High Pressure Coolant Injection System - Instrumentation and Controls
5. Design Baseline Document L-S-03, High Pressure Coolant Injection System
6. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
7. Functional Control Diagram 8031-M1-E41-1030-F

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Pump Minimum Flow Isolation Valve - PCIV

ID Nos.: HV-55-1F012, HV-55-2F012

P&ID/COORD (respectively): M-55 (SHT 1) / C-6, M-55 (SHT 2) / C-6

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 4.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal OC Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): The normally closed, motor-operated minimum flow isolation valves perform active safety functions in both the open and closed positions.

In the open position, these valves prevent the pump from being damaged by overheating due to the pump operating in a dead-headed, or low flow condition. They must be capable of opening to direct flow to the Suppression Pool upon receipt of a HPCI Pump low flow signal of < 550 gpm with a HPCI Pump discharge pressure > 125 psig. They must be capable of opening within 10 seconds to assure the HPCI System can be brought to design flow rate within 60 seconds from receipt of an initiation signal.

These valves must be capable of closing upon receipt of a HPCI Pump high flow signal of 650 gpm, increasing, thereby directing all flow to the Reactor Vessel. Additionally, they must be capable of automatic closure whenever the turbine stop valve, FV-56-1(2)12, is closed or when HPCI steam supply valve, F001, is fully closed. Failure of these valves to close subsequent to a turbine trip signal could result in draining the Condensate Storage Tank to the Suppression Pool.

These valves are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetration X-236. Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for them. Because the line penetration is below minimum required Suppression Pool level, a water seal is maintained at all times following an accident. Therefore, Type C testing is not required.

These valves must remain functional to support HPCI Pump operation during post accident conditions, and therefore do not receive a containment isolation signal for automatic closure. They have a maximum isolation time of 15 seconds.

The valve motor operators are powered from Division II of the Class 1E DC Power System to assure valve operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.4, Containment Isolation System
3. UFSAR Table 6.2-17, Containment Penetration Data
4. UFSAR Section 6.3, Emergency Core Cooling Systems
5. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
6. UFSAR Section 7.3.1.1.1.1, High Pressure Coolant Injection System - Instrumentation and Controls
7. Design Baseline Document L-S-03, High Pressure Coolant Injection System
8. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
9. Functional Control Diagram 8031-M1-E41-1030-F
10. LCR 95-13-0
11. ECR 96-00752

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Steam Drain Line to Condenser Inboard/Outboard Isolation Valves

ID Nos.: HV-55-1F028, HV-55-1F029, HV-55-2F028, HV-55-2F029

P&ID/COORD (respectively): M-55 (SHT 1) / C-2, B-2
M-55 (SHT 2) / C-2, B-2

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** AO

Positions: Normal_O_ Safety_C_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C),PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally open, fail-closed, air-operated steam drain isolation valves perform an active safety function in the closed position. During normal plant operation they are maintained in the open position to provide a drainage path for condensation which may have accumulated in the HPCI steam supply line. This condensate collects in the drain pot and is routed back to the Main Condenser. These valves must be capable of automatic closure to provide isolation between the HPCI steam supply and outside secondary containment. Failure of these valves to close could result in a release of radioactive materials outside secondary containment. They are provided with interlocks to assure their closure for drain line isolation when steam supply valve F001 opens, and when valve F001 closes, these valves open to provide a path for condensate drainage. These valves fail to their closed position on loss of electric power or loss of air. Drain valve F029 also serves as a Class 2 to non-Code boundary valve.

These steam line drain valves do not perform a safety function in the open position. They prevent water carry-over (water slugs) from the main steam lines and condensate in the HPCI steam supply line from entering the HPCI turbine. The steam supply lines are designed such that no pockets exist, thereby assuring that no slugs of water can be trapped in the lines. During HPCI system operation, any condensation is carried with the steam flow and exhausted to the Suppression Pool. Additionally, the Terry Turbines have been designed and tested to ensure that water carry-over will not cause damage to the turbine.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Quarterly fail-safe test to the closed position
Position indication verification once every two years

Reference(s):

1. UFSAR Section 6.3, Emergency Core Cooling Systems
2. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
3. UFSAR Section 7.3, Engineered Safety Features
4. Design Baseline Document L-S-03, High Pressure Coolant Injection System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Pump Suction From Suppression Pool Isolation Valves - F042 (PCIV)

ID Nos.: HV-55-1F041, HV-55-1F042, HV-55-2F041, HV-55-2F042

P&ID/COORD (respectively): M-55 (SHT 1) / E-3, B-7,
M-55 (SHT 2) / E-3, B-7

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 16.00 **Valve Type:** BF (F041)
GT (F042) **Act. Type:** MO

Positions: Normal C Safety O (F041)
OC (F042) Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C)-(F042), ST-Q(O)-(F041), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These normally closed, motor-operated valves are located in the HPCI Pump suction supply line from the Suppression Pool. The outboard isolation valves (F041s) perform an active safety function in the open position. The inboard isolation valves and PCIVs (F042s) perform active safety functions in the open and closed positions.

All of these valves must be capable of opening, after a 12 second time delay, when the CST reaches its low level setpoint in order to realign the HPCI Pump suction to the Suppression Pool. This establishes a closed loop for recirculation of water escaping from a line break.

The inboard isolation valves (F042s) also perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetration X-209. Since they must remain functional during post accident conditions, they do not receive a containment isolation signal for automatic closure. However, they must be capable of automatic closure upon receipt of a HPCI isolation signal to protect Suppression Pool inventory. They have a maximum isolation time of 160 seconds.

Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for these valves. Because the line penetration is below minimum required Suppression Pool level, a water seal is maintained at all times following an accident. Therefore, Type C testing is not required.

The outboard isolation valves (F041s) do not perform a safety function in the closed position. The isolation provisions for this line consist of a Suppression Pool water seal and one isolation valve outside of containment (F042).

Both valve motor operators are powered from Division II of the Class 1E DC Power System to assure valve operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions (F042)
Quarterly stroke time test to the open position (F041)
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.3-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 6.3, Emergency Core Cooling Systems
6. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
7. UFSAR Section 7.3, Engineered Safety Features
8. Design Baseline Document L-S-03, High Pressure Coolant Injection System
9. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
10. Functional Control Diagram 8031-M1-E41-1030-F
11. LCR 95-13-0
12. ECR 96-00752 Rev. 0

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Test Line Flush to Suppression Pool - PCIV

ID Nos.: HV-55-1F071, HV-55-2F071

P&ID/COORD (respectively): M-55 (SHT 1) / C-6, M-55 (SHT 2) / C-6

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 4.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These normally closed, motor-operated valves isolate the HPCI test line flush to the Suppression Pool and perform an active safety function in the closed position. They must be capable of automatic closure upon receipt of a HPCI initiation signal to prevent diversion of HPCI injection flow to the Suppression Pool in the event upstream isolation valve F008 fails to close. Additionally, they are identified in UFSAR Table 6.2-17 as a primary containment isolation valves for Penetration X-212. They have a maximum isolation time of 40 seconds.

Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for these valves. Because the line penetration is below minimum required Suppression Pool level, a water seal is maintained at all times following an accident. Therefore, Type C testing is not required.

These valves do not perform a safety function in the open position. The HPCI System flush line provides a path for additional flow testing of the system and provides a means to perform system flushing following actuation with suction taken from the Suppression Pool.

The valve motor operators are powered from Division II of the Class 1E DC Power System to assure valve operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.4, Containment Isolation System
3. UFSAR Table 6.2-17, Containment Penetration Data
4. UFSAR Section 6.3, Emergency Core Cooling Systems
5. UFSAR Section 7.3, Engineered Safety Features
6. Design Baseline Document L-S-03, High Pressure Coolant Injection System
7. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
8. Functional Control Diagram 8031-M1-E41-1030-F
9. LCR 95-13-0
10. ECR 96-00752 Rev. 0

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Turbine Exhaust Line - PCIV

ID Nos.: HV-55-1F072, HV-55-2F072

P&ID/COORD (respectively): M-55 (SHT 1) / C-6, M-55 (SHT 2) / C-6

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 12.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal O Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Safety Function(s): These normally open, motor-operated HPCI Turbine exhaust to Suppression Pool isolation valves (PCIVs) perform active safety functions in the open and closed positions.

If closed, these valves must be capable of opening, by remote manual switch, thereby clearing a permissive to enable HPCI steam supply valve F001 and lube oil cooling water supply valve F059 to open to support automatic HPCI initiation.

These valves also perform an active safety function in the closed position for containment isolation. They are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetration X-210. However, since they are required to remain functional during post accident conditions, they do not receive any isolation signals for automatic closure.

Per LCR 95-13-0, LGS Technical Specifications have been amended to remove Appendix J testing requirements for these valves. Because the line penetration is below minimum required Suppression Pool level, a water seal is maintained at all times following an accident. Therefore, Type C testing is not required.

The valve motor operators are powered from Division II of the class 1E DC Power System to assure valve operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.4, Containment Isolation System
3. UFSAR Table 6.2-17, Containment Penetration Data
4. UFSAR Section 6.3, Emergency Core Cooling Systems
5. UFSAR Section 7.3.1.1.1.1, High Pressure Coolant Injection System - Instrumentation and Controls
6. Design Baseline Document L-S-03, High Pressure Coolant Injection System
7. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
8. Functional Control Diagram 8031-M1-E41-1030-F
9. LCR 95-13-0
10. ECR 96-00752 Rev. 0

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Turbine Exhaust Line Vacuum Breaker Isolation Valves - PCIV

ID Nos.: HV-55-1F093, HV-55-1F095, HV-55-2F093, HV-55-2F095

P&ID/COORD (respectively): M-55 (SHT 1) / A-6, M-55 (SHT 1) / C-8, M-55 (SHT 2) / A-6, M-55 (SHT 2) / C-8

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 4.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_O_ Safety_OC_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The HPCI Turbine exhaust line vacuum breaker isolation valves perform active safety functions in both the open and closed positions.

In the open position, these valves prevent siphoning of Suppression Pool water into the exhaust line caused by the condensation of steam following system isolation. This is accomplished by admitting air from the containment free space to the turbine exhaust line when negative pressure within the line reaches a point where the vacuum breakers open. These valves, when open, provide a pathway to the containment free space from the steam exhaust line. Failure of these valves to open, by remote manual switch, could cause an overpressurization of the turbine exhaust piping upon system restart; resulting in a turbine trip or possible damage to the exhaust line, rendering the system inoperable.

These valves are identified in UFSAR Table 6.2-17 as containment isolation valves for Penetration X-228D. As such, they must be capable of closure to maintain containment integrity during a HPCI isolation signal. They close automatically on receipt of a high drywell pressure and low HPCI steam supply pressure signal. Both signals must be present for valve closure. The valves have a maximum isolation time of 40 seconds.

Control power for these valves is provided by separate Class 1E ac emergency buses, thereby ensuring isolation capability.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Tables 3.3.2-1 and 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 6.3, Emergency Core Cooling Systems
6. UFSAR Section 7.3, Engineered Safety Features
7. Design Baseline Document L-S-03, High Pressure Coolant Injection System
8. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
9. Functional Control Diagram 8031-M1-E41-1030-F

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Steam Line Bypass Warmup - PCIV

ID Nos.: HV-55-1F100, HV-55-2F100

P&ID/COORD (respectively): M-55 (SHT 1) / F-6, M-55 (SHT 2) / F-6

Code Class: 1 **Category:** A **Active/Passive:** A

Size: 1.50 **Valve Type:** GL **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally closed, motor-operated HPCI Main Steam supply line bypass warmup isolation valves perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as containment isolation valves for Penetration X-11. They do not receive an automatic closure signal for containment isolation, but must be capable of automatically closing upon receipt of a HPCI isolation signal which could indicate a line break occurrence in the HPCI steam supply line. In that case, these valves would perform a containment isolation function by automatically isolating the Reactor Vessel from the faulted line condition. These valves have a maximum isolation time of 45 seconds.

These valves do not perform a safety function in the open position. They are opened briefly during Plant startup to warm up the HPCI steam line prior to opening isolation valve F003.

Control power for these valves is provided by the same Class 1E emergency ac bus as that providing F003.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Tables 3.3.2-1 and 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 6.3, Emergency Core Cooling Systems
6. UFSAR Section 7.3, Engineered Safety Features
7. Design Baseline Document L-S-03, High Pressure Coolant Injection System
8. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Pump Discharge Isolation Valve to Loop A Feedwater

ID Nos.: HV-55-1F105, HV-55-2F105

P&ID/COORD (respectively): M-55 (SHT 1) / F-4, M-55 (SHT 2) / F-4

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 8.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal__C__ Safety__OC__ Failsafe__AI__

Test Frequency (Direction): ET-C, ST-C(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 55-VCS-2

Remarks: Cold shutdown justification 55-VCS-2 defers exercise testing of these valves due to their location at a high/moderate energy line break and their location inside the steam tunnel.

Safety Function(s): The normally closed, motor-operated HPCI Pump discharge isolation valves to Feedwater Loop A perform active safety functions in the open and closed positions.

These valves are identified in UFSAR Table 6.2-17 as containment isolation valves for Penetration X-9A. As such, they must be capable of closure to provide containment integrity if a HPCI isolation signal is present. However, since the HPCI System is required to be operational when primary containment isolation is necessary, they do not receive an automatic closure signal for containment isolation. They are interlocked to close when the steam supply valve, F001, is fully closed. They have a maximum isolation time of 30 seconds.

These valves must also be capable of automatic actuation to the open position on receipt of a HPCI initiation signal to direct flow to the Reactor Vessel. They are designed to open within 40 seconds to support the 60 second system response time.

These valves receive their control power from Division II of the Class 1E DC Power System, and are capable of operation independent of AC power.

Test Requirement(s):

Full stroke exercise test during cold shutdown
Stroke time test to the open and closed positions during cold shutdown
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 6.3, Emergency Core Cooling Systems
6. UFSAR Section 7.1.2.1.3, ECCS - Instrumentation and Controls
7. UFSAR Section 7.3.1.1.1.1, High Pressure Coolant Injection System - Instrumentation and Controls
8. Design Baseline Document L-S-03, High Pressure Coolant Injection System
9. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: Excess Flow Check Valves (EFCV) for HPCI Pump Turbine Steam Supply PDT-1(2)N057B&D (Hi/Lo) and PT-1(2)N058B,H,F&D - PCIVs

ID Nos.: XV-55-1F024A, XV-55-1F024B, XV-55-1F024C, XV-55-1F024D
XV-55-2F024A, XV-55-2F024B, XV-55-2F024C, XV-55-2F024D

P&ID/COORD (respectively): M-55 (SHT 1) / F-6, D-6, E-6, D-6,
M-55 (SHT 2) / F-6, D-6, E-6, D-6

Code Class: 1 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** XC **Act. Type:** SA

Positions: Normal_O_ Safety_C_ Failsafe_-_

Test Frequency (Direction): ET-R(F), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: GVROJ-2

Remarks: Refueling outage justification GVROJ-2 allows functional testing of excess flow check valves to be performed at refueling.

Safety Function(s): Per Regulatory Guide 1.11 (Safety Guide 11), an excess flow check valve may satisfy the containment isolation criteria of 10CFR50, Appendix A (General Design Criteria 55 and 56). For instrument lines penetrating containment that are part of the protection system, excess flow check valves are acceptable provided the instrument sensing lines are sized or orificed such that in the event of a postulated piping or component failure (1) leakage is reduced to the maximum extent practical consistent with other safety requirements, (2) the rate and extent of coolant loss is within the capability of the reactor coolant makeup system, (3) the integrity and performance of the secondary containment and associated safety systems will be maintained and (4) the potential offsite exposure will be substantially less than 10CFR100 requirements.

These normally open, 1 inch excess flow check valves are located at Penetrations X-3C-1, X-27B-1, X-3C-2 and X-27B-2. They have an active safety function to close in order to provide containment isolation and Reactor Coolant pressure boundary (RCPB) integrity subsequent to a loss of the instrument loop. The UFSAR stipulates that instrument lines from the RCPB which penetrate the containment shall conform with Reg.

Guide 1.11, which requires that they be equipped with a restricting orifice located inside the drywell, and an EFCV located outside and as close as practicable to the containment. In the event that an instrument line that communicates with the RCPB develops a leak outside the containment, a flow rate that results in a differential pressure across the valve of 3-10 psi causes the EFCV to close automatically. If an EFCV fails to close when required, the main flow path through the valve has a resistance to flow at least equivalent to a .375 inch diameter orifice.

These valves do not require Type C leak rate testing. The line does not isolate during a LOCA, and only leaks if the line or instrument ruptures. Leak tightness of the line is verified during the ILRT (Type A Test).

Test Requirements:

Exercise test in the forward direction during refueling outages.
Position indication verification at least once every 2 years

References:

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.4, Containment Isolation System
3. Design Baseline Document L-S-39, Reactor Core Isolation Cooling System
4. Regulatory Guide 1.11, Instrument Lines Penetrating Primary Reactor Containment

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI LO Cooler/Barometric Condenser Return Check Valve

ID Nos.: 56-1F048, 56-2F048

P&ID/COORD (respectively): M-56 (SHT 1) / B-5, M-56 (SHT 2) / B-5

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 2.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): ET-Q(F&R) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These check valves are located in the HPCI Lube Oil Cooler/ Barometric Condenser Condensate Pump return line to the HPCI Booster Pump suction piping and perform active safety functions in the open and closed positions.

In the closed position, these valves prevent draining of the CST to the Radwaste System via the HPCI Pump suction in the event that HV-56-1(2)F026 failed to reclose following the transfer of condensate from the Barometric Condenser while the HPCI System is in standby.

In the open position, these valves perform the active safety function of maintaining proper HPCI Lube Oil temperature by providing a return path for cooling water from the HPCI Lube Oil Cooler. They also provide a discharge flow path for condensate from the Barometric Condenser; however, this is not a safety function. Failure of these valves to open could result in excessively high lube oil temperatures, causing HPCI pump/turbine damage. Demonstration that these valves accomplish their safety function in the open position is provided by the ability to maintain proper lube oil temperatures during the quarterly IST pump tests. Other surveillance testing of the HPCI pumps/turbines provide added assurance that these valves are able to fulfill their required functions.

Test Requirement(s):

Quarterly exercise test to the open and closed positions

Reference(s):

1. UFSAR Section 6.3, Emergency Core Cooling Systems
2. UFSAR Section 7.3, Engineered Safety Features
3. Design Baseline Document L-S-03, High Pressure Coolant Injection System
4. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Vacuum Tank Condensate Pump Disch Check Valve

ID Nos.: 56-1F052, 56-2F052

P&ID/COORD (respectively): M-56 (SHT 1) / B-4, M-56 (SHT 2) / B-4

Code Class: 2 **Category:** N/A **Active/Passive:** N/A

Size: 2.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety - Failsafe -

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These check valves are located in the discharge lines of the Barometric Condenser Condensate Pumps. They have no safety function in the open or closed positions.

These valves open to allow condensate from the Barometric Condenser to be pumped to the Radwaste System when HPCI is in standby, or to the suction of the HPCI Booster Pump when HPCI is in operation. The Barometric Condenser and its associated equipment is non-safety related, Seismic Category IIA. Its failure does not prevent the HPCI System from fulfilling its core cooling objective.

In the closed position, these valves prevent cooling water flow which has passed through the HPCI Lube Oil Cooler from being diverted to the potentially faulted Barometric Condenser portion of the System, thus preventing it from being returned to the suction of the HPCI Booster Pump. In the event of a total loss of the Barometric Condenser subsystem, failure of these valves could result in the loss of approximately 50 gpm from the HPCI System. All resultant leakage would be contained within the secondary containment boundary. Based on the volume of water available and a 6 hour design requirement for HPCI System operation, the System could withstand the loss of these valves and still fulfill its required functions. Furthermore, evaluation has determined that flooding of the HPCI Room at a rate of approximately 50 gpm with 170°F water would not prevent the HPCI System from performing its intended functions.

Test Requirement(s):

No testing requirements.

Reference(s):

1. UFSAR Section 6.3.2.2.1, High Coolant Pressure Injection System
2. UFSAR Section 7.3.1.1.1.1.3, HPCI Initiating Circuits
3. Design Baseline Document L-S-03, High Pressure Coolant Injection System
4. PEP I0010878, Evaluation No. 3

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Lube Oil Cooler Discharge Check Valve

ID Nos.: 56-1F057, 56-2F057

P&ID/COORD (respectively): M-56 (SHT 1) / B-4, M-56 (SHT 2) / B-4

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 2.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal <u>OC</u> Safety <u>O</u> Failsafe <u>-</u>

Test Frequency (Direction): ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These check valves are located in the cooling water discharge piping from the HPCI Lube Oil Cooler and perform an active safety function in the open position. Failure of these valves to open could result in excessively high lube oil temperatures, causing HPCI pump/turbine damage. Demonstration that these valves accomplish their safety function in the open position is provided by the ability to maintain proper lube oil temperatures during the quarterly IST pump test. Other surveillance testing of the HPCI pumps/turbines provide added assurance that these valves are able to fulfill their required functions.

These valves do not perform a safety function in the closed position. They prevent recirculation of flow back to the Barometric Condenser when the HPCI System is in standby. This condition could result when the HPCI Vacuum Tank Condensate Pump cycles intermittently to transfer condensate from the Barometric Condenser to the Radwaste System when actuated by a level switch in the condenser. During HPCI System operation, flow through the Lube Oil Cooler would prevent this from occurring.

Test Requirement(s):

Quarterly exercise test to the open position

Reference(s):

1. UFSAR Section 6.3, Emergency Core Cooling Systems
2. UFSAR Section 7.3, Engineered Safety Features
3. Design Baseline Document L-S-03, High Pressure Coolant Injection System
4. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Turbine Control Valve

ID Nos.: FV-56-111, FV-56-211

P&ID/COORD (respectively): M-56 (SHT 1) / G-3, M-56 (SHT 2) / G-3

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 10.00 **Valve Type:** GL **Act. Type:** HYD

Positions: Normal_C_ Safety_O_ Failsafe_C_

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks: The turbine control valve shall be tested as a skid-mounted component, as described in NUREG-1482, Section 3.4.

Safety Function(s): These normally closed hydraulically-actuated valves perform an active safety function in the open position to regulate steam flow to the HPCI turbine to control its speed and therefore, the flow rate at which makeup water is injected into the Reactor Vessel. Hydraulic oil pressure for valve actuation is supplied by the D-C powered auxiliary oil pump during startup and then by the shaft-driven oil pump when the turbine speed is adequate. When approximately 85 psi of oil pressure is reached by the D-C powered auxiliary oil pump, the control valves open.

These valves do not perform an active safety function in the closed position. They are closed when the HPCI turbine is at rest and receive no closure signals subsequent to HPCI initiation. The primary means of steam supply isolation, when the turbine is in an idle state, is provided by steam supply isolation valve F001 and stop valve FV-56-1(2)12.

NUREG-1482, Paragraph 3.4, specifically identifies these valves as an example of a skid-mounted component. Therefore, satisfactory testing of the HPCI Pump/Turbine is an acceptable means for verifying their operational readiness.

Test Requirement(s):

No testing requirements

Reference(s):

1. UFSAR Section 6.3, Emergency Core Cooling Systems
2. UFSAR Section 7.3, Engineered Safety Features
3. Design Baseline Document L-S-03, High Pressure Coolant Injection System
4. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 3.4.
5. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Turbine Stop Valve

ID Nos.: FV-56-112, FV-56-212

P&ID/COORD (respectively): M-56 (SHT 1) / G-3, M-56 (SHT 2) / G-3

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 10.00 **Valve Type:** GL **Act. Type:** HYD

Positions: Normal C Safety O Failsafe C

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks: These valves shall be tested as a skid-mounted components, as described in NUREG-1482, Section 3.4.

Safety Function(s): These normally closed hydraulically-actuated valves perform an active safety function in the open position. Hydraulic oil pressure for valve actuation is supplied by the D-C powered auxiliary oil pump during startup and then by the shaft-driven oil pump when the turbine speed is adequate. When approximately 85 psig of oil pressure is reached by the D-C powered oil pump, these valves open. Valve stroke time to the open position is sufficient to assure the HPCI system can be brought to design flow rate within 60 seconds from receipt of the actuation signal. The safety function in the open position is to allow the admission of steam to the turbine, which in turn provides the motive force for pump operation. Additionally, loss of electric power, which de-energizes the trip solenoid valve, allows control oil to be dumped from the turbine stop valve resulting in valve closure by spring pressure.

These valves do not perform an active safety function in the closed position. They are identified as performing the function of emergency shutdown for the HPCI turbine. All automatic HPCI isolation signals, as well as manual and overspeed trip signals, relieve the oil pressure on the operator which allows spring tension to close the valve and block the admission of steam to the turbine. However, the safety related isolation function for a steam supply line break are performed by F002 and F003, which are tested to assure their isolation capability.

NUREG-1482, Paragraph 3.4, specifically identifies these valves as an example of a skid-mounted component. Therefore, satisfactory testing of the HPCI Pump/Turbine is an acceptable means for verifying their operational readiness.

Test Requirement(s):

No testing requirements

Reference(s):

1. UFSAR Section 6.3, Emergency Core Cooling Systems
2. UFSAR Section 7.3.1.1.1.1, High Pressure Coolant Injection System - Instrumentation and Controls
3. Design Baseline Document L-S-03, High Pressure Coolant Injection System
4. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 3.4.
5. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Barometric Condenser Drain Isolation Valves to Radwaste

ID Nos.: HV-56-1F025, HV-56-1F026, HV-56-2F025, HV-56-2F026

P&ID/COORD (respectively): M-56 (SHT 1) / A-5, B-5,
M-56 (SHT 2) / A-5, B-5

Code Class: 2 **Category:** N/A **Active/Passive:** N/A

Size: 1.00 **Valve Type:** GL **Act. Type:** AO

Positions: Normal OC Safety N/A Failsafe C

Test Frequency (Direction): N/A **Appendix J, Type C:** N/A

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These air-operated, fail-closed HPCI Barometric Condenser drain isolation valves do not perform a safety function in the open or closed positions. They function to maintain level in the Barometric Condenser when the HPCI System is in standby by routing excess condensate to the Dirty Radwaste System. When HPCI Turbine steam admission valve F001 is closed, F025 is automatically maintained in the open position, provided no HPCI initiation signal is present. F026 and the HPCI Vacuum Tank Condensate Pump are controlled by level in the Barometric Condenser, provided F001 is closed and no HPCI initiation signal is present. F026 opens at the high level setpoint and closes when the low level setpoint is reached. The Barometric Condenser is not required for HPCI System operation. This function enhances operational efficiency, but is not required for safe shutdown or accident mitigation.

When the HPCI System receives an auto-initiation signal, these valves automatically close, blocking the flow path to the Dirty Radwaste System. Condensate is then directed to the HPCI Pump suction piping via the Condensate Pump. However, failure of these valves to close would not compromise the safety function of the HPCI System. Any discharge of radioactive fluid would be contained in the HPCI Pump Room enclosure or directed to Dirty Radwaste. In either instance, there is no potential for a leakage path outside secondary containment.

Test Requirement(s):

No testing requirements

Reference(s):

1. UFSAR Section 6.3, Emergency Core Cooling Systems
2. UFSAR Section 7.3, Engineered Safety Features
3. Design Baseline Document L-S-03, High Pressure Coolant Injection System
4. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
5. Functional Control Diagram 8031-M1-E41-1030-F

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Lube Oil Cooler Supply Isolation Valves

ID Nos.: HV-56-1F059, HV-56-2F059

P&ID/COORD (respectively): M-56 (SHT 1) / D-6, M-56 (SHT 2) / D-6

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 2.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_C_ Safety_OC_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(O&C) PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed motor operated valves perform active safety functions in the open and closed positions.

These valves must be capable of automatically opening upon receipt of a HPCI system actuation signal to provide cooling water flow to the HPCI Lube Oil Cooler. Cooling water flow is necessary to support HPCI pump/turbine operation. Automatic actuation to the open position will occur only if steam exhaust valve F072 is open.

These valves must be capable of automatic closure when the associated turbine stop valve FV-56-1(2)12 closes in order to prevent draining of CST inventory to the HPCI Barometric Condenser which would subsequently be directed to Dirty Radwaste via the HPCI Vacuum Tank Condensate Pump.

The valve motor-operators are powered from Division II of the Class 1E DC Power System to assure valve operation independent of AC power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Tables 3.3.2-1 and 3.3.2-2
2. UFSAR Section 6.3, Emergency Core Cooling Systems
3. UFSAR Section 7.3, Engineered Safety Features
4. Design Baseline Document L-S-03, High Pressure Coolant Injection System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
6. Functional Control Diagram 8031-M1-E41-1030-F

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Pump to Lube Oil Cooler Pressure Control Valve

ID Nos.: PCV-056-1F035, PCV-56-2F035

P&ID/COORD (respectively): M-56 (SHT 1) / C-5, M-56 (SHT 2) / C-5

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 1.00 **Valve Type:** GT **Act. Type:** AO

Positions: Normal_O_ Safety_TH_ Failsafe_AI_

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These valves regulate cooling water pressure to the HPCI Lube Oil Cooler at 75 psia to provide a flow of approximately 50 gpm at rated conditions, thereby maintaining lube oil temperature out of the main bearings at less than 160°F. The oil supplied to the turbine/main pump bearings, governor valve assembly and stop valve is circulated through the cooler. These valves are maintained in a preset throttled position and are set to continuously regulate pressure. In the event they fail to regulate pressure at the required value, system design prevents overpressurization of the lube oil cooler by means of a restricting orifice downstream of the valve in addition to a downstream relief valve. These valves are exempt from Code requirements on the basis that they are pressure regulating valves without a failsafe position.

Test Requirement(s):

No testing requirements

Reference(s):

1. UFSAR Section 6.3, Emergency Core Cooling Systems
2. UFSAR Section 7.3, Engineered Safety Features
3. Design Baseline Document L-S-03, High Pressure Coolant Injection System
4. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section3.4.
5. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Turbine Exhaust Line Rupture Disk

ID Nos.: PSE-56-1D003, PSE-56-1D004,
PSE-56-2D003, PSE-56-2D004

P&ID/COORD (respectively): M-56 (SHT 1) / F-4, H-4,
M-56 (SHT 2) / F-4, H-4

Code Class: 2 **Category:** D **Active/Passive:** A

Size: 16.00 **Valve Type:** RD **Act. Type:** SA

Positions: Normal_C_ Safety_O_ Failsafe_-_

Test Frequency (Direction): RD-P2 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks: Rupture disks require replacement every five years.

Safety Function(s): The HPCI turbine exhaust rupture disks perform an active safety function by providing overpressure protection to the HPCI turbine and steam exhaust piping. The rupture disks have a burst pressure of 175 psig ± 10 psig and function as a pressure relief in the event of high turbine exhaust pressure due to a blocked exhaust line. Both disks must burst if pressure transmitters, PIS-56-N655D&H and PIS-56-N655B&F, fail to perform their function to trip the turbine by automatically closing the steam line isolation valves, F002 and/or F003. Failure of these rupture disks to burst could result in exceeding the pressure rating of the turbine exhaust piping.

Test Requirement(s):

Rupture disk test per Code requirements

Reference(s):

1. LGS Technical Specification Tables 3.3.2-1 and 3.3.2-2
2. UFSAR Section 6.3, Emergency Core Cooling Systems
3. UFSAR Section 7.3, Engineered Safety Features
4. Design Baseline Document L-S-03, High Pressure Coolant Injection System
5. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050
6. Functional Control Diagram 8031-M1-E41-1030-F

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Pump Suction Header Pressure Relief Valve

ID Nos.: PSV-56-1F020, PSV-56-2F020

P&ID/COORD (respectively): M-56 (SHT 1) / G-6, M-56 (SHT 2) / G-6

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 0.75 **Valve Type:** RL **Act. Type:** SA

Positions: Normal C Safety OC Failsafe -

Test Frequency (Direction): RT-P3 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These relief valves are located in the HPCI Pump suction lines between the HPCI Pumps and the Suppression Pool and CST suction isolation valves HV-55-1(2)F041 and HV-55-1(2)F004. During normal plant operation, the system is in standby with the HPCI pump suction aligned to the CST. In this alignment, these valves provide overpressure protection as required by ASME Section III, Article NC-7000, due to the Suppression Pool being isolated by two isolation valves plus a check valve in each line, and check valves 55-1(2)F019 preventing expansion back to the CST. If aligned to the Suppression Pool, the CST is isolated and check valves 55-1F045 prevent expansion toward the pool. Therefore, these valves provide overpressure protection for the HPCI suction piping whether aligned to the CST or the Suppression Pool, or isolated for maintenance.

Test Requirement(s):

Relief valve test once every 10 years

Reference(s):

1. UFSAR Section 6.3, Emergency Core Cooling Systems
2. UFSAR Section 7.3, Engineered Safety Features
3. Design Baseline Document L-S-03, High Pressure Coolant Injection System
4. GE Operations- and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

System (No): High Pressure Coolant Injection (HPCI) System (55 & 56)

Component Description: HPCI Lube Oil Cooler Relief Valve

ID Nos.: PSV-56-1F050, PSV-56-2F050

P&ID/COORD (respectively): M-56 (SHT 1) / C-5, M-56 (SHT 2) / C-5

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** RL **Act. Type:** SA

Positions: Normal_C_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): RT-P3 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These cooling water supply relief valves to the HPCI Lube Oil Cooler perform an active safety function by providing overpressure protection to the HPCI Lube Oil Cooler tubes and cooling water supply piping. They are located downstream of pressure control valve PCV-F035. They have a set point which provides adequate assurance of overpressure protection to the associated piping and components in the event that PCV-F035 fails to properly control pressure at the required 75 psia.

Test Requirement(s):

Relief valve test once every 10 years

Reference(s):

1. UFSAR Section 6.3, Emergency Core Cooling Systems
2. UFSAR Section 7.3, Engineered Safety Features
3. Design Baseline Document L-S-03, High Pressure Coolant Injection System
4. GE Operations and Maintenance Instruction, Vol. VII, Part 1, ECCS, GEK-97050

CONTAINMENT ATMOSPHERIC CONTROL (CAC) SYSTEM

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Hydrogen Recombiner Inlet Valve - Outboard PCIV

ID Nos.: FV-DO-101A, FV-DO-101B, FV-DO-201A, FV-DO-201B

P&ID/COORD (respectively): M-58 (SHT 1) / C-7, M-58 (SHT 2) / C-7, M-58 (SHT 3) / C-7, M-58 (SHT 4) / C-7

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 4.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal C Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed motor-operated valves are located in the inlet lines from the drywell to the Hydrogen Recombiners and perform active safety functions in the open and closed positions.

These valves are identified in UFSAR Table 6.2-17 as outboard primary containment isolation valves for Penetrations X-25 and X-26. As such, they must be capable of automatic closure upon receipt of a Group VIC containment isolation signal. They have a maximum isolation time of 90 seconds.

These valves must also be capable of opening by remote manual switch actuation to control flow when the associated post-LOCA Hydrogen Recombiner is manually placed into service. The Hydrogen Recombiners are required to prevent the accumulation of a combustible concentration of hydrogen and oxygen inside containment following a LOCA.

The valve motor operators are powered from separate Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.6
4. UFSAR Section 6.2.5, Combustible Gas Control in Containment
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
7. UFSAR Section 9.4.5, Primary Containment Ventilation System
8. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Suppression Pool Purge Exhaust to SGTS - Inboard PCIV

ID Nos.: HV-57-104, HV-57-204

P&ID/COORD (respectively): M-57 (SHT 2) / E-7, M-57 (SHT 5) / E-7

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 18.00 **Valve Type:** BF **Act. Type:** AO

Positions: Normal OC Safety C Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These air operated, fail-closed valves are located in the Suppression Pool purge exhaust line to the Standby Gas Treatment System and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as inboard primary containment isolation valves for Penetration X-202. Additionally, they are identified in T.S. Table 3.6.5.2.1-1 as Reactor enclosure secondary containment automatic isolation valves and in T.S. Table 3.6.5.2.2-1 as refueling area secondary containment ventilation system automatic isolation valves. As such, they must be capable of automatic closure upon receipt of a Group VIA containment isolation signal to maintain primary and secondary containment integrity. As specified in T.S. Tables 3.6.5.2.1-1 and 3.6.5.2.2-1, they have a maximum isolation time of 5 seconds.

These valves do not perform a safety function in the open position. They are opened to provide a flow path for Suppression Chamber gases to be exhausted to the Standby Gas Treatment System during containment inerting and high volume purging activities. High volume purging is performed to ventilate primary containment during Reactor shutdowns, or for inerting and deinerting the primary containment.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.6
4. LGS Technical Specification 3/4.6.5
5. LGS Technical Specification Tables 3.6.5.2.1-1 and 3.6.5.2.2-1
6. UFSAR Section 6.2.5, Combustible Gas Control in Containment
7. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
8. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
9. UFSAR Section 9.4.5, Primary Containment Ventilation System
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Suppression Pool Purge Exhaust Bypass - Inboard PCIV

ID Nos.: HV-57-105, HV-57-205

P&ID/COORD (respectively): M-57 (SHT 2) / D-6, M-57 (SHT 5) / D-6

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 2.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These motor-operated valves are located in the Suppression Pool purge exhaust bypass line to the Reactor enclosure equipment compartment exhaust filters and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as inboard primary containment isolation valves for Penetration X-202. As such, they must be capable of automatic closure upon receipt of a Group VIB containment isolation signal. They have a maximum isolation time of 15 seconds.

These valves do not perform a safety function in the open position. They are opened to provide a flow path for Suppression Chamber gases to be exhausted to the Reactor enclosure equipment compartment exhaust filters during low volume containment inerting and purging activities. Low volume purging is performed during normal power operation to maintain oxygen concentration and pressure of the primary containment within Technical Specification limits. The low volume purge alignment could also be used to control oxygen concentration and aid in cleanup after a LOCA in the event of a failure of both Hydrogen Recombiners. However, complete simultaneous failure of both units is not considered a credible event.

The valve motor operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification 3/4.6.6
5. UFSAR Section 6.2.5, Combustible Gas Control in Containment
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Nitrogen Purge Isolation Valve - Outboard PCIV

ID Nos.: HV-57-109, HV-57-209

P&ID/COORD (respectively): M-57 (SHT 1) / E-5, M-57 (SHT 4) / E-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 6.00 **Valve Type:** BF **Act. Type:** MO

Positions: Normal_OC_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These motor operated valves are located in the nitrogen purge supply lines to the drywell and Suppression Pool and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as outboard primary containment isolation valves for Penetrations X-25 and X-201A. As such, they must be capable of automatic closure upon receipt of a Group VIA containment isolation signal to maintain primary containment integrity. They also form a boundary between the Class 2 CAC piping and the non-Code Seismic Category IIA nitrogen supply piping. They have a maximum isolation time of 6 seconds.

These valves do not perform a safety function in the open position. They are opened to provide a flow path from the liquid nitrogen facility to the primary containment for the purpose of nitrogen inerting.

The valve motor operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification 3/4.6.6
5. UFSAR Section 6.2.5, Combustible Gas Control in Containment
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Spray Water Supply to Hydrogen Recombiner Cooler

ID Nos.: HV-57-110A, HV-57-110B, HV-57-168A, HV-57-168B, HV-57-210A, HV-57-210B, HV-57-268A, HV-57-268B

P&ID/COORD (respectively): M-57 (SHT 2) / E-8, M-57 (SHT 1) / F-2, M-57 (SHT 2) / E-8, M-57 (SHT 1) / F-2, M-57 (SHT 5) / E-8, M-57 (SHT 4) / F-3, M-57 (SHT 5) / E-8, M-57 (SHT 4) / F-3

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 1.00 (1(2)10A&B)
1.50 (1(2)68A&B) **Valve Type:** GL **Act. Type:** MO

Positions: Normal C Safety O Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed motor-operated valves are located in the spray water supply line from RHR to the Hydrogen Recombiner water spray cooler and perform an active safety function in the open position. They must be capable of opening to allow cooling of the recombined gases from the reaction chamber prior to returning to the primary containment. Failure to cool the recombined gases may result in exceeding the design temperature of the primary containment as recombination occurs when gases are heated to approximately 1300°F. Outboard isolation valves 1(2)68A&B open by remote manual switch actuation. Inboard isolation valves 1(2)10A&B open automatically subsequent to starting the Hydrogen Recombiner blower and return to the closed position when the blower is removed from service. Loss of cooling water will cause a Recombiner trip on high gas return temperature.

These valves do not perform a safety function in the closed position.

The valve motor operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open position
Position indication verification once every two years

Reference(s):

1. UFSAR Section 6.2.5, Combustible Gas Control in Containment
2. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
3. UFSAR Section 9.4.5, Primary Containment Ventilation System
4. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
5. E-389, Schematic Diagram
6. M40-78, Hydrogen Recombiner Electrical Schematic

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Drywell Purge Exhaust Bypass - Inboard PCIV

ID Nos.: HV-57-111, HV-57-211

P&ID/COORD (respectively): M-57 (SHT 2) / G-5, M-57 (SHT 5) / G-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 2.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These motor-operated valves are located in the drywell purge exhaust bypass line to the reactor enclosure equipment compartment exhaust filters and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as inboard primary containment isolation valves for Penetration X-26. As such, they must be capable of automatic closure upon receipt of a Group VIB containment isolation signal to maintain primary containment integrity They' have a maximum isolation time of 15 seconds.

These valves do not perform a safety function in the open position. They are opened to provide a flow path for Suppression Chamber gases to be exhausted to the Reactor enclosure equipment compartment exhaust filters during low volume containment inerting and purging activities. Low volume purging is performed during normal power operation to maintain oxygen concentration and pressure of the primary containment within Technical Specification limits. The low volume purge alignment could also be used to control oxygen concentration and aid in cleanup after a LOCA in the event of a failure of both Hydrogen Recombiners. However, complete simultaneous failure of both units is not considered a credible event.

The valve motor operators are powered from Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification 3/4.6.6
5. UFSAR Section 6.2.5, Combustible Gas Control in Containment
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Suppression Pool Purge Exhaust to SGTS - Outboard PCIV

ID Nos.: HV-57-112, HV-57-212

P&ID/COORD (respectively): M-57 (SHT 2) / F-7, M-57 (SHT 5) / F-7

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 18.00 **Valve Type:** BF **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These motor-operated valves are located in the Suppression Pool purge exhaust line to the Standby Gas Treatment System and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as outboard primary containment isolation valves for Penetration X-202. Additionally, they are identified in T.S. Table 3.6.5.2.1-1 as Reactor enclosure secondary containment automatic isolation valves and in T.S. Table 3.6.5.2.2-1 as refueling area secondary containment ventilation system automatic isolation valves. As such, they must be capable of automatic closure upon receipt of a Group VIA containment isolation signal to maintain primary and secondary containment integrity. As specified in T.S. Tables 3.6.5.2.1-1 and 3.6.5.2.2-1, they have a maximum isolation time of 6 seconds.

These valves do not perform a safety function in the open position. They are opened to provide a flow path for Suppression Chamber gases to be exhausted to the Standby Gas Treatment System during containment inerting and high volume purging activities. High volume purging is performed to ventilate primary containment during Reactor shutdowns, or for inerting and deinerting the primary containment.

The valve motor operators are powered from Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification Tables 3.6.5.2.1-1 and 3.6.5.2.2-1
5. LGS Technical Specification 3/4.6.6
6. UFSAR Section 6.2.5, Combustible Gas Control in Containment
7. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
8. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
9. UFSAR Section 9.4.5, Primary Containment Ventilation System
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Drywell Purge Exhaust to SGTS - Inboard PCIV

ID Nos.: HV-57-114, HV-57-214

P&ID/COORD (respectively): M-57 (SHT 2) / F-6, M-57 (SHT 5) / F-6

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 24.00 **Valve Type:** BF **Act. Type:** AO

Positions: Normal_OC_ Safety_C_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These air-operated, fail-closed valves are located in the drywell purge exhaust line to the Standby Gas Treatment System and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as inboard primary containment isolation valves for Penetration X-26. Additionally, they are identified in T.S. Table 3.6.5.2.1-1 as Reactor enclosure secondary containment automatic isolation valves and in T.S. Table 3.6.5.2.2-1 as refueling area secondary containment ventilation system automatic isolation valves. As such, they must be capable of automatic closure upon receipt of a Group VIA containment isolation signal to maintain primary and secondary containment integrity. As specified in T.S. Tables 3.6.5.2.1-1 and 3.6.5.2.2-1, they have a maximum isolation time of 5 seconds.

These valves do not perform a safety function in the open position. They are opened to provide a flow path for drywell gases to be exhausted to the Standby Gas Treatment System during containment inerting and high volume purging activities. High volume purging is performed to ventilate primary containment during Reactor shutdowns, or for inerting and deinerting the primary containment.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification Tables 3.6.5.2.1-1 and 3.6.5.2.2-1
5. LGS Technical Specification 3/4.6.6
6. UFSAR Section 6.2.5, Combustible Gas Control in Containment
7. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
8. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
9. UFSAR Section 9.4.5, Primary Containment Ventilation System
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Drywell Purge Exhaust to SGTS - Outboard PCIV

ID Nos.: HV-57-115, HV-57-215

P&ID/COORD (respectively): M-57 (SHT 2) / G-6, M-57 (SHT 5) / G-6

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 24.00 **Valve Type:** BF **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These air-operated, fail-closed valves are located in the drywell purge exhaust line to the Standby Gas Treatment System and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as inboard primary containment isolation valves for Penetration X-26. Additionally, they are identified in T.S. Table 3.6.5.2.1-1 as Reactor enclosure secondary containment automatic isolation valves and in T.S. Table 3.6.5.2.2-1 as refueling area secondary containment ventilation system automatic isolation valves. As such, they must be capable of automatic closure upon receipt of a Group VIA containment isolation signal to maintain primary and secondary containment integrity. As specified in T.S. Tables 3.6.5.2.1-1 and 3.6.5.2.2-1, they have a maximum isolation time of 5 seconds.

These valves do not perform a safety function in the open position. They are opened to provide a flow path for drywell gases to be exhausted to the Standby Gas Treatment System during containment inerting and high volume purging activities. High volume purging is performed to ventilate primary containment during Reactor shutdowns, or for inerting and deinerting the primary containment.

The valve motor operators are powered from Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification Tables 3.6.5.2.1-1 and 3.6.5.2.2-1
5. LGS Technical Specification 3/4.6.6
6. UFSAR Section 6.2.5, Combustible Gas Control in Containment
7. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
8. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
9. UFSAR Section 9.4.5, Primary Containment Ventilation System
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Low Flow Nitrogen Makeup Line Isolation Valve - Outboard PCIV

ID Nos.: HV-57-116, HV-57-216

P&ID/COORD (respectively): M-57 (SHT 1) / F-5, M-57 (SHT 4) / F-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 1.50 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_OC_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These motor-operated valves are located in the nitrogen low flow purge supply lines to the drywell and Suppression Pool and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as outboard primary containment isolation valves for Penetrations X-62 and X-220A. As such, they must be capable of automatic closure upon receipt of a Group VIC containment isolation signal to maintain primary containment integrity. These valves form a boundary between the Class 2 CAC piping and the non-Code, Seismic Category IIA nitrogen supply piping. They have a maximum isolation time of 30 seconds.

These valves do not perform a safety function in the open position. They are opened to provide a low volume flow path from the liquid nitrogen facility to the primary containment for maintaining the oxygen concentration and pressure of the primary containment atmosphere within Technical Specification limits during normal power operation. The low volume purge alignment could also be used to control oxygen concentration and aid in cleanup after a LOCA in the event of a failure of both Hydrogen Recombiners. However, complete simultaneous failure of both units is not considered a credible event.

The valve motor operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification 3/4.6.6
5. UFSAR Section 6.2.5, Combustible Gas Control in Containment
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Drywell Purge Exhaust Bypass - Outboard PCIV

ID Nos.: HV-57-117, HV-57-217

P&ID/COORD (respectively): M-57 (SHT 2) / G-5, M-57 (SHT 5) / G-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 2.00 **Valve Type:** GL **Act. Type:** AO

Positions: Normal OC Safety C Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These air operated, fail-closed valves are located in the drywell purge exhaust bypass line to the Reactor enclosure equipment compartment exhaust filters and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as inboard primary containment isolation valves for Penetration X-26. As such, they must be capable of automatic closure upon receipt of a Group VIB containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves do not perform a safety function in the open position. They are opened to provide a flow path for drywell gases to be exhausted to the Reactor enclosure equipment compartment exhaust filters during low volume containment inerting and purging activities. Low volume purging is performed during normal power operation to maintain oxygen concentration and pressure of the primary containment within Technical Specification limits. The low volume purge alignment could also be used to control oxygen concentration and aid in cleanup after a LOCA in the event of a failure of both Hydrogen Recombiners. However, complete simultaneous failure of both units is not considered a credible event.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification 3/4.6.6
5. UFSAR Section 6.2.5, Combustible Gas Control in Containment
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Suppression Pool Purge Exhaust Bypass - Outboard PCIV

ID Nos.: HV-57-118, HV-57-218

P&ID/COORD (respectively): M-57 (SHT 2) / E-6, M-57 (SHT 5) / E-6

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 2.00 **Valve Type:** GL **Act. Type:** AO

Positions: Normal OC Safety C Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These air-operated, fail-closed valves are located in the Suppression Pool purge exhaust bypass line to the Reactor enclosure equipment compartment exhaust filters and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as outboard primary containment isolation valves for Penetration X-202. As such, they must be capable of automatic closure upon receipt of a Group VIB containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves do not perform a safety function in the open position. They are opened to provide a flow path for Suppression Pool gases to be exhausted to the Reactor enclosure equipment compartment exhaust filters during low volume containment inerting and purging activities. Low volume purging is performed during normal power operation to maintain oxygen concentration and pressure of the primary containment within Technical Specification limits. The low volume purge alignment could also be used to control oxygen concentration and aid in cleanup after a LOCA in the event of a failure of both Hydrogen Recombiners. However, complete simultaneous failure of both units is not considered a credible event.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification 3/4.6.6
5. UFSAR Section 6.2.5, Combustible Gas Control in Containment
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Drywell Nitrogen Purge Isolation Valve - Inboard PCIV

ID Nos.: HV-57-121, HV-57-221

P&ID/COORD (respectively): M-57 (SHT 1) / D-5, M-57 (SHT 4) / D-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 6.00 **Valve Type:** BF **Act. Type:** AO

Positions: Normal OC Safety C Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These air operated, fail-closed valves are located in the nitrogen purge supply lines to the drywell and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as inboard primary containment isolation valves for Penetration X-25 and outboard isolation for X-201A. As such, they must be capable of automatic closure upon receipt of a Group VIA isolation signals to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves do not perform a safety function in the open position. They are opened to provide a flow path from the liquid nitrogen facility to the drywell for the purpose of nitrogen inerting.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification 3/4.6.6
5. UFSAR Section 6.2.5, Combustible Gas Control in Containment
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Drywell/Suppression Pool Air Purge Isolation Valve - Inboard PCIV

ID Nos.: HV-57-123, HV-57-124, HV-57-223, HV-57-224

P&ID/COORD (respectively): M-57 (SHT 1) / D-4, D-4, M-57 (SHT 4) / D-4, D-4

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 24.00 **Valve Type:** BF **Act. Type:** AO

Positions: Normal_OC_ Safety_C_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These air-operated, fail-closed valves are located in the air purge supply lines from the Reactor enclosure supply fans to the primary containment and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as inboard primary containment isolation valves for Penetrations X-25 and X-201A. As such, they must be capable of automatic closure upon receipt of a Group VIA containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves do not perform a safety function in the open position. They are opened during high volume purging when the Reactor Enclosure HVAC System is used for the source of purge air to maintain a well ventilated environment for personnel access.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification 3/4.6.6
5. UFSAR Section 6.2.5, Combustible Gas Control in Containment
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Suppression Pool Nitrogen Purge Isolation Valve - Inboard PCIV

ID Nos.: HV-57-131, HV-57-231

P&ID/COORD (respectively): M-57 (SHT 1) / D-5, M-57 (SHT 4) / D-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 6.00 **Valve Type:** BF **Act. Type:** AO

Positions: Normal_OC_ Safety_C_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These air operated, fail-closed valves are located in the nitrogen purge supply lines to the Suppression Chamber and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as inboard primary containment isolation valves for Penetration X-201A and outboard isolation for X-25. As such, they must be capable of automatic closure upon receipt of a Group VIA containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves do not perform a safety function in the open position. They are opened to provide a flow path from the liquid nitrogen facility to the Suppression Chamber for the purpose of nitrogen inerting the primary containment to maintain oxygen concentration within Technical Specification limits.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification 3/4.6.6
5. UFSAR Section 6.2.5, Combustible Gas Control in Containment
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Drywell/Suppression Pool Air Purge Isolation Valve - Outboard PCIV

ID Nos.: HV-57-135, HV-57-147, HV-57-235, HV-57-247

P&ID/COORD (respectively): M-57 (SHT 1) / D-4, D-3, M-57 (SHT 4) / D-4, D-3

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 24.00 **Valve Type:** BF **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These motor-operated valves are located in the air purge supply lines from the reactor enclosure supply fans to the primary containment and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as outboard primary containment isolation valves for Penetrations X-25 and X-201A. As such, they must be capable of automatic closure upon receipt of a Group VIA containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 6 seconds.

These valves do not perform a safety function in the open position. They are opened during high volume purging when the Reactor Enclosure HVAC System is used for the source of purge air for de-inerting to maintain a well ventilated environment for personnel access to the primary containment.

The valve motor operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification 3/4.6.6
5. UFSAR Section 6.2.5, Combustible Gas Control in Containment
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Nitrogen Inerting Block Valves

ID Nos.: HV-57-160A, HV-57-160B, HV-57-260A, HV-57-260B

P&ID/COORD (respectively): M-57 (SHT 1) / G-5, G-5, M-57 (SHT 4) / G-5, G-5

Code Class: 3 **Category:** N/A **Active/Passive:** N/A

Size: 6.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal O Safety N/A Failsafe AI

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These Class 3 motor-operated valves are located in the non-Code, Seismic IIA portion of piping between the liquid nitrogen facility and the primary containment high/low volume purge lines. They do not perform a safety function in the open or closed positions.

These valves receive multiple signals for automatic closure which include Group VIB containment isolation and nitrogen temperature - high/low (high 135°F - low 40°F). However, since they are located in lines constructed to Seismic IIA requirements which could render them nonfunctional following an SSE, they cannot be credited with the capability of performing any function required for safe shutdown or accident mitigation. They are not identified in the UFSAR or Technical Specifications as primary or secondary containment isolation valves.

These valves do not perform a safety function in the open position. They provide a flow path from the liquid nitrogen facility to the primary containment for the purpose of nitrogen inerting in order to maintain oxygen concentration levels within Technical Specification limits.

Test Requirement(s):

No testing requirements

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification 3/4.6.6
5. UFSAR Section 6.2.3.2.3, Containment Bypass Leakage
6. UFSAR Section 6.2.5, Combustible Gas Control in Containment
7. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
8. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
9. UFSAR Section 9.4.5, Primary Containment Ventilation System
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
11. Schematic Diagram E-394, SH.3, Bypass Leakage Barrier MOVs

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Hydrogen Recombiner Inlet Valve - Inboard PCIV

ID Nos.: HV-57-161, HV-57-163, HV-57-261, HV-57-263

P&ID/COORD (respectively): M-57 (SHT 2) / E-7, M-57 (SHT 1) / D-3, M-57 (SHT 5) / E-7, M-57 (SHT 4) / D-3

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 4.00 **Valve Type:** BF **Act. Type:** MO

Positions: Normal C Safety OC Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed motor-operated valves are located in the inlet lines from the drywell to the Hydrogen Recombiners and perform active safety functions in the open and closed positions.

These valves are identified in UFSAR Table 6.2-17 as inboard primary containment isolation valves for Penetrations X-25 and X-26. As such, they must be capable of automatic closure upon receipt of a Group VIC containment isolation signal. They have a maximum isolation time of 9 seconds.

These valves must also be capable of opening by remote manual switch actuation to provide a flow path when the associated post-LOCA Hydrogen Recombiner is manually placed into service. The Hydrogen Recombiners are required to prevent the accumulation of a combustible concentration of hydrogen and oxygen inside containment following a LOCA.

The valve motor operators are powered from separate Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.6
4. UFSAR Section 6.2.5, Combustible Gas Control in Containment
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
7. UFSAR Section 9.4.5, Primary Containment Ventilation System
8. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Hydrogen Recombiner "A" Discharge to Suppression Pool - Inboard/Outboard PCIVs

ID Nos.: HV-57-162, HV-57-166, HV-57-262, HV-57-266

P&ID/COORD (respectively): M-57 (SHT 2) / C-6, C-7, M-57 (SHT 5) / C-6, C-7

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 6.00 **Valve Type:** BF **Act. Type:** MO

Positions: Normal_C_ Safety_OC_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These motor-operated valves are located in the "A" Recombiner water separator return line to the Suppression Pool and perform active safety functions in the open and closed positions.

These valves are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetration X-202. As such, they must be capable of automatic closure upon receipt of a Group VIC containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 9 seconds.

These valves must be capable of opening, by remote manual switch actuation, to provide a flow path for water separator content from the "A" Hydrogen Recombiner to return to the Suppression Pool via the high volume purge line. Cooled gas flowing from the water spray cooler is passed through the water separator to prevent any remaining water droplets from entering the recombined gas recirculation line.

The valve motor operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification 3/4.6.6
5. UFSAR Section 6.2.5, Combustible Gas Control in Containment
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Hydrogen Recombiner "B" Discharge to Suppression Pool - Inboard/Outboard PCIVs

ID Nos.: HV-57-164, HV-57-169, HV-57-264, HV-57-269

P&ID/COORD (respectively): M-57 (SHT 1) / C-3, B-3, M-57 (SHT 4) / C-3, C-3

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 6.00 **Valve Type:** BF **Act. Type:** MO

Positions: Normal_C_ Safety_OC_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These motor-operated valves are located in the "B" Recombiner water separator return line to the Suppression Pool and perform active safety functions in the open and closed positions.

These valves are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetration X-201A. As such, they must be capable of automatic closure upon receipt of a Group VIC containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 9 seconds.

These valves must be capable of opening, by remote manual switch actuation, to provide a flow path for water separator content from the "B" Hydrogen Recombiner to return to the Suppression Pool via the high volume purge line. Cooled gas flowing from the water spray cooler is passed through the water separator to prevent any remaining water droplets from entering the recombined gas recirculation line.

The valve motor operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. LGS Technical Specification 3/4.6.5
4. LGS Technical Specification 3/4.6.6
5. UFSAR Section 6.2.5, Combustible Gas Control in Containment
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Nitrogen Bypass Leakage Barrier Vent Valves

ID Nos.: HV-57-165, HV-57-167, HV-57-265, HV-57-267

P&ID/COORD (respectively): M-57 (SHT 1) / G-6, F-6, M-57 (SHT 4) / G-6, F-6

Code Class: NC (U1)
3 (U2) **Category:** N/A **Active/Passive:** N/A

Size: 1.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal C Safety N/A Failsafe AI

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These-motor operated valves are located in non-Code, Seismic IIA branch connection lines between the low volume purge line and the Reactor Enclosure HVAC System. They do not perform any safety function in the open or closed positions.

These valves automatically open on receipt of a Group VIC containment isolation signal to allow nitrogen leakage past block valves HV-57-1(2)60A&B to be routed to the Reactor Enclosure HVAC System and exhausted to atmosphere via the south vent stack. This prevents overpressurization of the high/low volume purge piping by the entrained nitrogen when a containment isolation is necessary. Although it is desirable to maintain the integrity of the purge system, it is not required to place or maintain the plant in a safe shutdown condition or to mitigate the consequences of an accident.

These valves are normally closed during operation to allow normal inerting and purging activities to be performed in order to maintain oxygen concentration within Technical Specification limits. This function is required for plant operation, but is not required for safe shutdown or accident mitigation.

Test Requirement(s):

No testing requirements

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. UFSAR Section 6.2.3.2.3, Containment Bypass Leakage
3. UFSAR Section 6.2.5, Combustible Gas Control in Containment
4. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
5. UFSAR Section 9.4.5, Primary Containment Ventilation System
6. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
7. Schematic Diagram E-394, SH.4, Bypass Leakage Barrier MOVs

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Primary Containment Vacuum Relief Valves

ID Nos.: PSV-57-137A-1 through PSV-57-137D-2,
PSV-57-237A-1 through PSV-57-237D-2

P&ID/COORD: M-57 (SHT 2) / G-3, G-3, E-3, E-3, C-3, C-3, A-3, A-3,
M-57 (SHT 5) / G-3, G-3, E-3, E-3, C-3, C-3, A-3, A-3

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 24.00 **Valve Type:** VR **Act. Type:** SA

Positions: Normal_C_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): RT-P3, PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The primary containment vacuum relief valve assemblies consist of two valves per assembly and are attached to the downcomers located in the Suppression Chamber. They perform active safety functions in the open and closed positions.

They are required to open to limit the differential pressure between the Suppression Chamber and the drywell. When the Suppression Chamber pressure exceeds the drywell pressure, the vacuum relief valves open to allow gases from the Suppression Chamber to enter the downcomer and flow upward into the drywell, thereby equalizing pressure. The opening setpoint of each individual valve is 0.5 psid. However, because the assembly consists of two valves in series, measurable flow starts when the differential pressure across the valve assembly reaches 1.0 psid, and both valves reach fully open position when the differential pressure is 2.9 psid.

The valves must be capable of closing in the event of a pipe break in the drywell to assure that escaping steam will be quenched in the Suppression Pool in order to control containment pressure. The use of two valves in series within each assembly prevents a failure of any single valve in the stuck open position from compromising the pressure suppression capability of the primary containment.

Test Requirement(s):

Vacuum breaker (relief valve) testing every 10 years
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.6.4
2. UFSAR Section 6.2.5, Combustible Gas Control in Containment
3. UFSAR Section 7.1.2.1.16.2, PCVR System - Instrumentation and Controls
4. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
5. UFSAR Section 9.4.5, Primary Containment Ventilation System
6. Design Baseline Document L-S-25A, Primary Containment Pressure Suppression System
7. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Hydrogen Recombiner Containment Drain to Drywell

ID Nos.: PSV-57-162, PSV-57-164, PSV-57-262, PSV-57-264

P&ID/COORD (respectively): M-57 (SHT 2) / C-7, M-57 (SHT 1) / A-3, M-57 (SHT 5) / C-8, M-57 (SHT 4) / C-2

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** RL **Act. Type:** SA

Positions: Normal C Safety OC Failsafe -

Test Frequency (Direction): RT-P3 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These valves are located in the containment Hydrogen Recombiner outlet lines. The Hydrogen Recombiners and associated piping and components are required to prevent the buildup of hydrogen and oxygen to explosive concentrations inside the primary containment following a LOCA. These relief valves are specifically identified in Section 6.2.5.2.1 of the UFSAR which states that the recombiner outlet lines are each provided with pressure relief valves to protect the outlet piping from overpressurization in the event of recombiner cooling water line isolation valve leakage from the RHR system during recombiner isolation.

In order for this to occur, water from the RHR System would have to leak by two normally-closed, in-series, motor-operated globe valves, HV-57-1(2)10A/B and HV-57-1(2)68A/B, and completely fill the associated Recombiner. A level switch is provided in the Recombiner outlet piping that alerts the operator in the Control Room if the level exceeds a preset value. Any leakage past the series isolation valves would be detected by the level switch resulting in operator action which minimizes the potential for an overpressure condition. Additionally, the Recombiner outlet line containment isolation valves, which are located in the same piping as the relief valve, are butterfly valves which are designed to seal from the direction of the primary containment. Therefore, it is possible that any overpressurization in the Recombiner outlet lines would leak by the containment isolation valves (i.e., into containment) based on the design of the valves.

Despite the extremely low probability that an overpressure condition could develop at the location of these valves, they do provide overpressure protection to a portion of a system which is required to mitigate the consequences of an accident. Therefore, they are included in the scope of the IST Program.

Test Requirement(s):

Relief valve test once every 10 years

Reference(s):

1. UFSAR Section 6.2.5, Combustible Gas Control In Containment
2. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
2. UFSAR Section 9.4.5, Primary Containment Ventilation System
3. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: PT-101 and LT-52-140A(L) Suppression Pool Atmosphere

ID Nos.: SV-57-101, SV-57-201

P&ID/COORD (respectively): M-57 (SHT 1) / B-6, M-57 (SHT 4) / B-6

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 2.00 **Valve Type:** GL **Act. Type:** SO

Positions: Normal_O_ Safety_OC_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These fail-closed, solenoid-operated valves are located in post accident monitoring instrumentation lines for Suppression Chamber pressure and pool level. They perform an active safety function in the closed position and a passive safety function in the open position.

These valves are identified in UFSAR Table 6.2-17 as outboard primary containment isolation valves for penetration X-220B (Unit 1) and X-229A (Unit 2). However, they remain open following an accident to monitor conditions inside containment and do not receive any automatic closure signals. They must be capable of closure by remote manual switch actuation to maintain primary containment integrity and provide long term leakage control in the event of a loss of the associated instrument loop. The piping is considered an extension of the containment boundary since it must be available for long term usage following a design basis LOCA, and is designed to the same quality standards as the primary containment. Leak tightness of the penetration is verified during the Type A test, Type C testing is not required. These valves have a maximum isolation time of 5 seconds.

These valves are normally open and must remain open to measure containment conditions post-LOCA. Since the only reason to close these valves would be a loss of the associated instrument loop, there would be no necessity to reopen them.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

The valve solenoid operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.7.5-1
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.5, Combustible Gas Control in Containment
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
6. UFSAR Table 7.5-3, Post Accident Monitoring Instrumentation
7. UFSAR Section 9.4.5, Primary Containment Ventilation System
8. UFSAR Section 11.5.5, Post Accident Sampling Systems
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
10. Design Baseline Document L-S-49, Post Accident Sampling System

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Drywell H_2/O_2 Sample Line Inboard/Outboard Isolation Valves - PCIVs

ID Nos.: SV-57-132, SV-57-142, SV-57-232, SV-57-242

P&ID/COORD (respectively): M-57 (SHT 1) / E-6, A-4 M-57 (SHT 4) / E-6, A-4

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 1.00 [1(2)32]
0.50 [1(2)42] **Valve Type:** GL **Act. Type:** SO

Positions: Normal O Safety OC Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open, fail-closed, solenoid-operated valves are located in H_2/O_2 sampling lines from the drywell (EL 242') and are required to change position for post accident monitoring. They perform active safety functions in the open and closed positions.

These valves are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetration X-28A-2. As such, they must be capable of automatic closure upon receipt of a Group VIC containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves must be capable of opening by remote manual switch actuation, if closed, to provide a flow path from the drywell atmosphere to the Combustible Gas Analyzer. Monitoring H_2/O_2 concentrations in the drywell is a safety related function of the CAC System, and is required during post accident conditions to assess the condition of primary containment.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

The valve solenoid operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the open and closed positions
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification Table 3.3.7.5-1
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 6.2.5, Combustible Gas Control in Containment
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
7. UFSAR Table 7.5-3, Post Accident Monitoring Instrumentation
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. UFSAR Section 11.5.5, Post Accident Sampling Systems
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
11. Design Baseline Document L-S-49, Post Accident Sampling System

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Drywell H_2/O_2 Sample Line Inboard/Outboard Isolation Valves - PCIVs

ID Nos.: SV-57-133, SV-57-143, SV-57-195
SV-57-233, SV-57-243, SV-57-295

P&ID/COORD (respectively): M-57 (SHT 1) / E-6, A-4, M-57 (SHT 2) / B-6,
M-57 (SHT 4) / E-6, A-4, M-57 (SHT 5) / B-6

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 1.00 [1(2)33]
0.50 **Valve Type:** GL **Act. Type:** SO

Positions: Normal_O_ Safety_OC_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally open fail-closed, solenoid operated valves are located in H_2/O_2 sampling lines from the drywell (EL 255') and are required to change position for post accident monitoring. They perform active safety functions in the open and closed positions.

They are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetration X-28B. As such, they must be capable of automatic closure upon receipt of a Group VIC containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves must be capable of opening by remote manual switch actuation, if closed, to provide a flow path from the drywell atmosphere to the Combustible Gas Analyzer. Monitoring H_2/O_2 concentrations in the drywell is a safety related function of the CAC System, and is required during post accident conditions to assess the condition of primary containment.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

The valve solenoid operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the open and closed positions
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification Table 3.3.7.5-1
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 6.2.5, Combustible Gas Control in Containment
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
7. UFSAR Table 7.5-3, Post Accident Monitoring Instrumentation
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. UFSAR Section 11.5.5, Post Accident Sampling Systems
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
11. Design Baseline Document L-S-49, Post Accident Sampling System

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Drywell H_2/O_2 Sample Line Inboard/Outboard Isolation Valves - PCIVs

ID Nos.: SV-57-134, SV-57-144, SV-57-234, SV-57-244

P&ID/COORD (respectively): M-57 (SHT 1) / E-6, A-4 M-57 (SHT 4) / E-6, A-4

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 1.00 [1(2)34]
0.50 [1(2)44] **Valve Type:** GL **Act. Type:** SO

Positions: Normal_O_ Safety_OC_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally open fail-closed, solenoid operated valves are located in H_2/O_2 sampling lines from the drywell (EL 291') and are required to change position for post accident monitoring. They perform active safety functions in the open and closed positions.

They are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetration X-28A-3. As such, they must be capable of automatic closure upon receipt of a Group VIC containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves must be capable of opening by remote manual switch actuation, if closed, to provide a flow path from the drywell atmosphere to the Combustible Gas Analyzer. Monitoring H_2/O_2 concentrations in the drywell is a safety related function of the CAC System, and is required during post accident conditions to assess the condition of primary containment.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

The valve solenoid operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the open and closed positions
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification Table 3.3.7.5-1
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 6.2.5, Combustible Gas Control in Containment
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
7. UFSAR Table 7.5-3, Post Accident Monitoring Instrumentation
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. UFSAR Section 11.5.5, Post Accident Sampling Systems
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
11. Design Baseline Document L-S-49, Post Accident Sampling System

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Drywell Purge Exhaust Instrument Line to PT-139

ID Nos.: SV-57-139, SV-57-239

P&ID/COORD (respectively): M-57 (SHT 2) / G-6, M-57 (SHT 5) / G-6

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 0.50 **Valve Type:** GL **Act. Type:** SO

Positions: Normal O Safety C Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open fail-closed, solenoid-operated valves are located in drywell pressure post accident monitoring instrument lines. They perform an active safety function in the closed position and a passive safety function in the open position.

These valves are identified in UFSAR Table 6.2-17 as inboard primary containment isolation valves for Penetration X-26. However, they remain open following an accident to monitor conditions inside containment and do not receive any automatic closure signals. They must be capable of closure by remote manual switch actuation to maintain primary containment integrity and provide long term leakage control in the event of a loss of the associated instrument loop. The piping is considered an extension of the containment boundary since it must be available for long term usage following a design basis LOCA, and is designed to the same quality standards as the primary containment. Leak tightness of the penetration is verified during the Type A test, Type C testing is not required. These valves have a maximum isolation time of 5 seconds.

These valves are normally open and must remain open to measure containment conditions post-LOCA. Since the only reason to close these valves would be a loss of the associated instrument loop, there would be no necessity to reopen them.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

The valve solenoid operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. T.S. Table 3.3.7.5-1
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.5, Combustible Gas Control in Containment
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
6. UFSAR Table 7.5-3, Post Accident Monitoring Instrumentation
7. UFSAR Section 9.4.5, Primary Containment Ventilation System
8. UFSAR Section 11.5.5, Post Accident Sampling Systems
9. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
10. Design Baseline Document L-S-49, Post Accident Sampling System

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Wetwell H_2/O_2 Sample Line Inboard/Outboard Isolation Valves - PCIVs

ID Nos.: SV-57-141, SV-57-181, SV-57-184
SV-57-241, SV-57-281, SV-57-284

P&ID/COORD (respectively): M-57 (SHT 1) / A-5, C-6, M-57 (SHT 2) / B-7,
M-57 (SHT 4) / A-5, C-6, M-57 (SHT 5) / B-7

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 1.00 [1(2)81]
0.50 **Valve Type:** GL **Act. Type:** SO

Positions: Normal_O_ Safety_OC_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open, fail-closed, solenoid-operated valves are located in H_2/O_2 sampling lines from the Suppression Chamber atmosphere and are required to change position for post accident monitoring. They perform active safety functions in the open and closed positions.

These valves are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetration X-221A. As such, they must be capable of automatic closure upon receipt of a Group VIC containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves must be capable of opening by remote manual switch actuation, if closed, to provide a flow path from the Suppression Chamber atmosphere to the Combustible Gas Analyzer. Monitoring H_2/O_2 concentrations in the Suppression Chamber is a safety related function of the CAC System, and is required during post accident conditions to assess the condition of primary containment.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

The valve solenoid operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the open and closed positions
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification Table 3.3.7.5-1
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 6.2.5, Combustible Gas Control in Containment
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
7. UFSAR Table 7.5-3, Post Accident Monitoring Instrumentation
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. UFSAR Section 11.5.5, Post Accident Sampling Systems
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
11. Design Baseline Document L-S-49, Post Accident Sampling System

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Drywell Purge Exhaust Sample Line Outboard PCIV

ID Nos.: SV-57-145, SV-57-245

P&ID/COORD (respectively): M-57 (SHT 1) / B-3, M-57 (SHT 4) / B-3

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 0.50 **Valve Type:** GL **Act. Type:** SO

Positions: Normal O Safety C Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open, fail-closed, solenoid-operated valves are located in sample lines off the drywell high volume purge lines downstream of inboard isolation valves HV-57-1(2)14. They perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as outboard primary containment isolation valves for Penetration X-26. As such, they must be capable of automatic closure upon receipt of a Group VIC isolation signal to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves do not perform a safety function in the open position. They are provided to allow sampling H_2O_2 concentrations in the drywell gases exhausted to the Standby Gas Treatment System during containment inerting and high volume purging activities. High volume purging is performed during Reactor shutdowns to ventilate the primary containment for personnel access . High volume purging may also be performed during operational modes of startup, power operation, and hot shutdown for the purpose of inerting and deinerting the primary containment. These functions are necessary for plant operation, but are not required to place or maintain the Reactor in a safe shutdown condition or to mitigate the consequences of an accident.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

The valve solenoid operators are powered from the Class 1E ac emergency buses to ensure closure capability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification Table 3.3.7.5-1
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 6.2.5, Combustible Gas Control in Containment
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
7. UFSAR Table 7.5-3, Post Accident Monitoring Instrumentation
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. UFSAR Section 11.5.5, Post Accident Sampling Systems
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
11. Design Baseline Document L-S-49, Post Accident Sampling System

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: PASS Sample Valves

ID Nos.: SV-57-146A, SV-57-146B, SV-57-147A, SV-57-147B
SV-57-246A, SV-57-246B, SV-57-247A, SV-57-247B

P&ID/COORD (respectively): M-57 (SHT 2) / A-6, M-57 (SHT 1) / A-5,
M-57 (SHT 2) / A-6, M-57 (SHT 1) / A-5,
M-57 (SHT 5) / A-6, M-57 (SHT 4) / A-5,
M-57 (SHT 5) / A-6, M-57 (SHT 4) / A-5

Code Class: 2 **Category:** N/A **Active/Passive:** N/A

Size: 1.00 (Unit 2)
0.50 (Unit 1) **Valve Type:** GL **Act. Type:** SO

Positions: Normal OC Safety N/A Failsafe C

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These fail-closed, solenoid operated valves are located in the supply lines from the primary containment atmosphere to the post accident sample system and are outside the containment penetration boundary. These valves do not perform a safety function in either the open or closed positions and are not within the scope of the IST Program.

Test Requirement(s):

No testing requirements

Reference(s):

1. UFSAR Table 7.5-3, Post Accident Monitoring Instrumentation
2. UFSAR Section 11.5.5, Post Accident Sampling Systems
3. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
4. Design Baseline Document L-S-49, Post Accident Sampling System

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Drywell H_2/O_2 Sample Return Line Inboard/Outboard Isolation Valves - PCIVs

ID Nos.: SV-57-150, SV-57-159, SV-57-250, SV-57-259

P&ID/COORD (respectively): M-57 (SHT 1) / D-6, A-5, M-57 (SHT 4) / D-6, A-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** SO

Positions: Normal O Safety OC Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open, fail-closed, solenoid-operated valves are located in H_2/O_2 sampling return lines from the Combustible Gas Analyzer to the drywell and are required to change position for post accident monitoring. They perform active safety functions in the open and closed positions.

These valves are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetration X-62. As such, they must be capable of automatic closure upon receipt of a Group VIC containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves must be capable of opening by remote manual switch actuation, if closed, to provide a return flow path from the Combustible Gas Analyzer to the drywell atmosphere. Monitoring H_2/O_2 concentrations in the drywell is a safety related function of the CAC System, and is required during post accident conditions to assess the condition of primary containment.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

The valve solenoid operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the open and closed positions
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification Table 3.3.7.5-1
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 6.2.5, Combustible Gas Control in Containment
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
7. UFSAR Table 7.5-3, Post Accident Monitoring Instrumentation
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. UFSAR Section 11.5.5, Post Accident Sampling Systems
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
11. Design Baseline Document L-S-49, Post Accident Sampling System

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Wetwell H_2/O_2 Sample Line Inboard/Outboard Isolation Valves - PCIVs

ID Nos.: SV-57-183, SV-57-186, SV-57-283, SV-57-286

P&ID/COORD (respectively): M-57 (SHT 2) / C-6, B-7, M-57 (SHT 5) / C-6, B-7

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 1.00 [1(2)83]
0.50 **Valve Type:** GL **Act. Type:** SO

Positions: Normal O Safety OC Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open, fail-closed, solenoid-operated valves are located in H_2/O_2 sampling lines from the Suppression Chamber atmosphere and are required to change position for post-accident monitoring. They perform active safety functions in the open and closed positions.

These valves are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetration X-221B. As such, they must be capable of automatic closure upon receipt of a Group VIC containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves must be capable of opening by remote manual switch actuation, if closed, to provide a flow path from the Suppression Chamber atmosphere to the Combustible Gas Analyzer. Monitoring H_2/O_2 concentrations in the Suppression Chamber is a safety related function of the CAC System, and is required during post-accident conditions to assess the condition of primary containment.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

The valve solenoid operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the open and closed positions
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification Table 3.3.7.5-1
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 6.2.5, Combustible Gas Control in Containment
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
7. UFSAR Table 7.5-3, Post Accident Monitoring Instrumentation
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. UFSAR Section 11.5.5, Post Accident Sampling Systems
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
11. Design Baseline Document L-S-49, Post Accident Sampling System

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Suppression Pool Purge Exhaust Sample Line Outboard PCIV

ID Nos.: SV-57-185, SV-57-285

P&ID/COORD (respectively): M-57 (SHT 2) / B-7, M-57 (SHT 5) / B-7

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 0.50 **Valve Type:** GL **Act. Type:** SO

Positions: Normal_O_ Safety_C_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open, fail-closed, solenoid-operated valves are located in sample lines off the Suppression Chamber high volume purge lines downstream of inboard isolation valves HV-57-1(2)04. They perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as outboard primary containment isolation valves for Penetration X-202. As such, they must be capable of automatic closure upon receipt of a Group VIC containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves do not perform a safety function in the open position. They are provided to allow sampling H_2O_2 concentrations in the Suppression Chamber gases exhausted to the Standby Gas Treatment System during containment inerting and high volume purging activities. High volume purging is performed during Reactor shutdowns to ventilate the primary containment for personnel access . High volume purging may also be performed during operational modes of startup, power operation, and hot shutdown for the purpose of inerting and deinerting the primary containment. These functions are necessary for plant operation, but are not required to place or maintain the Reactor in a safe shutdown condition or to mitigate the consequences of an accident.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

The valve solenoid operators are powered from the Class 1E ac emergency buses to ensure closure capability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification Table 3.3.7.5-1
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 6.2.5, Combustible Gas Control in Containment
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
7. UFSAR Table 7.5-3, Post Accident Monitoring Instrumentation
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. UFSAR Section 11.5.5, Post Accident Sampling Systems
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
11. Design Baseline Document L-S-49, Post Accident Sampling System

System (No): Containment Atmospheric Control (CAC) System (57)

Component Description: Suppression Pool H_2/O_2 Sample Return Line Inboard/Outboard Isolation Valves - PCIVs

ID Nos.: SV-57-190, SV-57-191, SV-57-290, SV-57-291

P&ID/COORD (respectively): M-57 (SHT 2) / B-6, C-6, M-57 (SHT 5) / B-6, C-6

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 2.00 [1(2)91]
1.00 [1(2)90] **Valve Type:** GL **Act. Type:** SO

Positions: Normal O Safety OC Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open, fail-closed, solenoid-operated valves are located in H_2/O_2 sampling return lines from the Combustible Gas Analyzer to the Suppression Chamber atmosphere and are required to change position for post accident monitoring. They perform active safety functions in the open and closed positions.

These valves are identified in UFSAR Table 6.2-17 as primary containment isolation valves for Penetration X-62. As such, they must be capable of automatic closure upon receipt of a Group VIC containment isolation signal to maintain primary containment integrity. They have a maximum isolation time of 5 seconds.

These valves must be capable of opening by remote manual switch actuation, if closed, to provide a return flow path from the Combustible Gas Analyzer to the Suppression Chamber atmosphere. Monitoring H_2/O_2 concentrations in the Suppression Chamber is a safety related function of the CAC System, and is required during post-accident conditions to assess the condition of primary containment.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

The valve solenoid operators are powered from the Class 1E ac emergency buses to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the open and closed positions
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification Table 3.3.7.5-1
3. LGS Technical Specification 3/4.6.3
4. UFSAR Section 6.2.5, Combustible Gas Control in Containment
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.3.1.1.6, CAC System - Instrumentation and Controls
7. UFSAR Table 7.5-3, Post Accident Monitoring Instrumentation
8. UFSAR Section 9.4.5, Primary Containment Ventilation System
9. UFSAR Section 11.5.5, Post Accident Sampling Systems
10. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems
11. Design Baseline Document L-S-49, Post Accident Sampling System

PRIMARY CONTAINMENT INSTRUMENT GAS (PCIG) SYSTEM

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: Instrument Gas Supply Check Valve to Vacuum Relief Valves - Inboard PCIV

ID Nos.: 59-1001, 59-2001

P&ID/COORD (respectively): M-59 (SHT 1) / B-5, M-59 (SHT 3) / B-5

Code Class: 2 **Category:** A/C **Active/Passive:** A

Size: 1.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal OC Safety C Failsafe -

Test Frequency (Direction): ET-R(R), LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: 59-ROJ-1

Remarks: Refueling outage justification 59-ROJ-1 allows exercise testing of these valves to be performed on a refueling outage frequency.

Safety Function(s): These check valves are located in the nonessential Instrument Gas supply lines to the primary containment vacuum relief valve assemblies. They perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as inboard containment isolation valves for Penetration X-218. As such, they must be capable of closure in the event of a loss of the attached non-Code Instrument Gas piping to maintain containment integrity.

These valves have no safety function in the open position. Instrument gas is supplied to the vacuum relief valve air operators to facilitate periodic exercising for verification of valve operability. The air operators are not required to function for the vacuum relief valve assemblies to perform their safety function.

Test Requirement(s):

Exercise test to the closed position during refueling outages
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. LGS Technical Specification 3/4.6.4
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
6. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems
7. Design Baseline Document L-S-25A, Primary Containment Pressure Suppression System

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: Primary Containment Headers A and B Instrument Gas Supply Check Valves - Inboard PCIV

ID Nos.: 59-1005A, 59-1005B, 59-2005A, 59-2005B

P&ID/COORD (respectively): M-59 (SHT 1) / E-5, F-5, M-59 (SHT 3) / E-5, F-5

Code Class: 2 **Category:** AC **Active/Passive:** A

Size: 1.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_C_ Failsafe_-_

Test Frequency (Direction): ET-R(R), LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: 59-ROJ-1

Remarks: Refueling outage justification 59-ROJ-1 allows exercise testing of these valves to be performed on a refueling outage frequency.

Safety Function(s): These check valves are located in the nonessential Instrument Gas supply headers from the Instrument Gas Compressors to primary containment. They perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as inboard containment isolation valves for Penetrations X-40H-1 and X-3B. As such, they must be capable of closure in the event of a loss of the attached non-Code instrument gas piping to maintain containment integrity.

These valves do not perform a safety function in the open position. Instrument Gas is supplied to the primary containment to provide actuating air to various safety and non-safety components during all normal plant operating conditions. The safety related components which are dependent upon actuating air to perform their required functions are either provided with individual Seismic Category I air receivers or are supplied with actuating air from the Seismic Category I long-term Nitrogen Supply System.

Test Requirement(s):

Exercise test to the closed position during refueling outages
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. LGS Technical Specification 3/4.6.4
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
6. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: Long Term Nitrogen Supply Check Valves to ADS Valves

ID Nos.: 59-1023E, 59-1023H, 59-1023K, 59-1023M, 59-1023S,
59-2023E, 59-2023H, 59-2023K, 59-2023M, 59-2023S

P&ID/COORD (respectively): M-59 (SHT 1) / H-3, G-3, H-3, G-3, G-3,
M-59 (SHT 3) / H-3, G-3, H-3, G-3, G-3

Code Class: 3 **Category:** AC **Active/Passive:** A

Size: 1.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): ET-R(F&R), LP-T **Appendix J, Type C:** N

VRR/VCS/ROJ: 59-ROJ-1

Remarks: Refueling outage justification 59-ROJ-1 allows exercise testing of these valves to be performed on a refueling outage frequency.

Safety Function(s): These check valves are located in the nitrogen supply lines to the ADS valve accumulators. They perform active safety functions in the open and closed positions.

These valves must be capable of opening to allow flow from the safety grade nitrogen bottles to the ADS valve accumulators in the event that the non-safety grade PCIG System Compressors are unavailable. The nitrogen bottles are sized to provide an adequate amount of nitrogen to maintain ADS operation for seven days post-LOCA. Connections external to the primary containment are provided to allow additional bottles to be connected to support ADS operation for 100 days post-LOCA, thereby satisfying design requirements for ECCS operability.

These valves must be capable of closing to maintain ADS accumulator pressure. Per LGS response to FSAR Question 271.2, these valves will be subject to seat leakage testing with an allowable leakage not to exceed 78 scc/min to ensure the accumulators are capable of maintaining sufficient volume for two ADS valve actuations over a six hour period. This is sufficient to ensure the ADS valves can perform their safety functions during the initial stages of a small break LOCA in conjunction with the failure of HPCI.

Test Requirement(s):

Exercise test to the open and closed positions during refueling outages
Seat leakage rate test once every two years

Reference(s):

1. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
2. LGS FSAR Question 271.2, Qualification of ADS Accumulators
3. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: Instrument Air Supply Check Valves to ADS Valves

ID Nos.: 59-1024E, 59-1024H, 59-1024K, 59-1024M, 59-1024S, 59-2024E, 59-2024H, 59-2024K, 59-2024M, 59-2024S

P&ID/COORD (respectively): M-59 (SHT 1) / G-4, G-4, G-4, G-4, G-4, M-59 (SHT 3) / G-4, G-4, G-4, G-4, G-4

Code Class: 3 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_C_ Failsafe_-_

Test Frequency (Direction): ET-R(R) **Appendix J, Type C:** N

VRR/VCS/ROJ: 59-ROJ-1

Remarks: Refueling outage justification 59-ROJ-1 allows exercise testing of these valves to be performed on a refueling outage frequency.

Safety Function(s): These check valves are located in the normal Instrument Gas supply headers to the ADS valve accumulators and perform an active safety function in the closed position. They must be capable of closure to maintain ADS accumulator pressure by the long-term nitrogen supply bottles in the event that the normal supply is lost. They provide a boundary between the Class 3, Seismic Category I nitrogen piping and the non-Code, Seismic Category IIA PCIG piping.

These valves do not perform a safety function in the open position. During normal operating conditions, air is supplied to the ADS accumulators from the PCIG System. The long-term nitrogen supply bottles are provided as a backup source to the ADS valves if the PCIG System is unavailable.

Test Requirement(s):

Exercise test to the closed position during refueling outages

Reference(s):

1. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
2. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems
3. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 4.1.1

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: TIP Purge Supply Check Valve - Inboard PCIV

ID Nos.: 59-1056, 59-2056

P&ID/COORD (respectively): M-59 (SHT 1) / D-5, M-59 (SHT 3) / D-5

Code Class: 2 **Category:** A/C **Active/Passive:** A

Size: 1.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_C_ Failsafe_-_

Test Frequency (Direction): ET-R(R), LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: 59-ROJ-1

Remarks: Refueling outage justification 59-ROJ-1 allows exercise testing of these valves to be performed on a refueling outage frequency.

Safety Function(s): These check valves are located in the TIP purge supply lines to the TIP indexing mechanisms and guide tubes and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as inboard containment isolation valves for Penetration X-35B. As such, they must be capable of closure in the event of a loss of the attached non-Code Instrument Gas piping to maintain containment integrity.

These valves do not perform a safety function in the open position. They open to allow a purge to be applied to the guide tubes and indexing mechanisms in order to prevent internal corrosion due to condensation. This is not required for safe shutdown of the Reactor or for accident mitigation.

Test Requirement(s):

Exercise test to the closed position during refueling outages
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.4, Containment Isolation System
3. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
4. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
5. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems
6. Design Baseline Document L-S-20, Neutron Monitoring System

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: Long Term Nitrogen Supply Check Valves to ADS Valves - Inboard PCIV

ID Nos.: 59-1112, 59-1128, 59-2112, 59-2128

P&ID/COORD (respectively): M-59 (SHT 1) / H-4, G-4, M-59 (SHT 3) / H-4, G-4

Code Class: 2 **Category:** A/C **Active/Passive:** A

Size: 1.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_OC_ Failsafe_-_

Test Frequency (Direction): ET-R(F&R), LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: 59-ROJ-1

Remarks: Refueling outage justification 59-ROJ-1 allows exercise testing of these valves to be performed on a refueling outage frequency.

Safety Function(s): These check valves are located in the nitrogen supply lines to the ADS valve accumulators. They perform active safety functions in the open and closed positions.

These valves must be capable of opening to allow flow from the safety grade nitrogen bottles to the ADS valve accumulators in the event that the non-safety grade PCIG System Compressors are unavailable. The nitrogen bottles are sized to provide an adequate amount of nitrogen to maintain ADS operation for seven days post-LOCA. Connections external to the primary containment are provided to allow additional bottles to be connected to support ADS operation for 100 days post-LOCA, thereby satisfying design requirements for ECCS operability.

These valves are identified in UFSAR Table 6.2.17 as inboard containment isolation valves for Penetrations X-3D-2 and X-27A. As such, they must be capable of closure to maintain containment integrity in the event of a depressurization of the long term nitrogen supply piping following an accident.

Test Requirement(s):

Exercise test to the open and closed positions during refueling outages
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.4, Containment Isolation System
3. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
4. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
5. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: Instrument Air Supply Check Valves to ADS Valves

ID Nos.: 59-1131E, 59-1131H, 59-1131K, 59-1131M, 59-1131S,
59-2131E, 59-2131H, 59-2131K, 59-2131M, 59-2131S

P&ID/COORD (respectively): M-59 (SHT 1) / G-3, G-3, G-3, G-3, G-3,
M-59 (SHT 3) / G-3, G-3, G-3, G-3, G-3

Code Class: 3 **Category:** A/C **Active/Passive:** A

Size: 1.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_C_ Failsafe_-_

Test Frequency (Direction): ET-R(R), LP-T **Appendix J, Type C:** N

VRR/VCS/ROJ: 59-ROJ-1

Remarks: Refueling outage justification 59-ROJ-1 allows exercise testing of these valves to be performed on a refueling outage frequency.

Safety Function(s): These check valves are located in the normal Instrument Gas supply headers to the ADS valve accumulators and perform an active safety function in the closed position. They must be capable of closure to maintain ADS accumulator pressure by the long-term nitrogen supply bottles in the event that the normal supply is lost. Per LGS response to FSAR Question 271.2, these valves will be subject to seat leakage testing with an allowable leakage not to exceed 78 scc/min to ensure the accumulators are capable of maintaining sufficient volume for two ADS valve actuations over a six hour period. This is sufficient to ensure the ADS valves can perform their safety functions during the initial stages of a small break LOCA in conjunction with the failure of HPCI.

These valves do not perform a safety function in the open position. During normal operating conditions, air is supplied to the ADS accumulators from the PCIG System. The long-term nitrogen supply bottles are provided as a backup source to the ADS valves if the PCIG System is unavailable.

Test Requirement(s):

Exercise test to the closed position during refueling outages
Seat leakage rate test once every two years.

Reference(s):

1. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
2. LGS FSAR Question 271.2, Qualification of ADS Accumulators
3. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems
4. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 4.1.1

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: PCIG Compressor Suction Supply Isolation Valve - Inboard PCIV

ID Nos.: HV-59-101, HV-59-201

P&ID/COORD (respectively): M-59 (SHT 1) / C-5, M-59 (SHT 3) / C-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 1.50 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_O_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-R, ST-R(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 59-ROJ-2

Remarks: Refueling outage justification 59-ROJ-2 allows exercise testing of these valves to be performed on a refueling outage frequency due to the potential of the MSIVs drifting closed and their location inside primary containment.

Safety Function(s): These normally open, motor-operated valves are located in the suction supply line to the PCIG Compressors from inside primary containment and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as inboard containment isolation valves for Penetration X-40F-2. As such, they must be capable of automatic closure upon receipt of a Group VIIA containment isolation signal to maintain containment integrity upon a loss of the non-Code PCIG piping. They have a maximum isolation time of 45 seconds.

These valves do not perform a safety function in the open position. When open, they align the suction of the PCIG Compressors with the drywell. The PCIG Compressors provide Instrument Gas to pneumatic devices inside primary containment during normal plant operation. Those components which are dependent upon pneumatic pressure to perform their safety related functions are either provided with individual Seismic Category I receivers or are supplied with nitrogen from the Seismic Category I long term nitrogen supply system. The safety-related, seismically-qualified supplies provide backup in the event the normal non-Code, Seismic Category IIA PCIG System is unavailable.

The valve motor operators are powered from the Class 1E ac emergency power supply to ensure closure capability during a loss of offsite power.

Test Requirement(s):

Full stroke exercise test during refueling outages
Stroke time test to the closed position during refueling outages
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
6. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: PCIG Compressor Suction Supply Isolation Valve - Outboard PCIV

ID Nos.: HV-59-102, HV-59-202

P&ID/COORD (respectively): M-59 (SHT 1) / C-5, M-59 (SHT 3) / C-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** AO

Positions: Normal_O_ Safety_C_ Failsafe_C_

Test Frequency (Direction): ET-C, FS-C(C), ST-C(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: 59-VCS-1

Remarks: Cold shutdown justification 59-VCS-1 allows valve exercising to be performed during cold shutdowns due to the potential of the MSIVs drifting closed.

Safety Function(s): These normally-open, air-operated valves are located in the suction supply line to the PCIG Compressors from inside primary containment and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as outboard containment isolation valves for Penetration X-40F-2. As such, they must be capable of automatic closure upon receipt of a Group VIIA containment isolation signal to maintain containment integrity upon loss of the attached non-Code Instrument Gas piping. They have a maximum isolation time of 7 seconds and fail to the closed position upon loss of air or power.

These valves do not perform a safety function in the open position. When open, they align the suction of the PCIG Compressors with the drywell. The PCIG Compressors provide Instrument Gas to pneumatic devices inside primary containment during normal plant operation. Those components which are dependent upon pneumatic pressure to perform their safety related functions are either provided with individual Seismic Category I receivers or are supplied with nitrogen from the Seismic Category I long term nitrogen supply system. The safety-related, seismically-qualified supplies provide backup in the event the normal non-Code, Seismic Category IIA PCIG System is unavailable.

Test Requirement(s):

Full stroke exercise test during cold shutdowns
Fail-safe test to the closed position during cold shutdowns
Stroke time test to the closed position during cold shutdowns
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
6. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: PCIG Headers A and B Drywell Supply Isolation Valves - Outboard PCIV

ID Nos.: HV-59-129A, HV-59-129B, HV-59-229A, HV-59-229B

P&ID/COORD (respectively): M-59 (SHT 1) / E-5, F-5, M-59 (SHT 3) / E-5, F-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** AO

Positions: Normal_O_ Safety_C_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open, air-operated valves are located in the PCIG A and B supply headers to primary containment and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as outboard containment isolation valves for penetrations X-40H-1 and X-3B. As such, they must be capable of automatic closure upon receipt of a Group VIIA containment isolation signal to maintain containment integrity upon loss of the attached non-Code Instrument Gas piping. They have a maximum isolation time of 7 seconds and fail to the closed position upon loss of air or power.

These valves do not perform a safety function in the open position. When open, they align the suction of the PCIG Compressors with the drywell. The PCIG Compressors provide Instrument Gas to pneumatic devices inside primary containment during normal plant operation. Those components which are dependent upon pneumatic pressure to perform their safety related functions are either provided with individual Seismic Category I receivers or are supplied with nitrogen from the Seismic Category I long term nitrogen supply system. The safety-related, seismically-qualified supplies provide backup in the event the normal non-Code, Seismic Category IIA PCIG System is unavailable.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
6. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: PCIG TIP Purge - Outboard PCIV

ID Nos.: HV-59-131, HV-59-231

P&ID/COORD (respectively): M-59 (SHT 1) / D-5, M-59 (SHT 3) / D-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** AO

Positions: Normal O Safety C Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open, air-operated valves are located in the TIP purge supply line to the TIP indexing mechanisms and guide tubes and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as outboard containment isolation valves for Penetration X-35B. As such, they must be capable of automatic closure upon receipt of a Group VIIB containment isolation signal to maintain containment integrity upon loss of the attached non-Code Instrument Gas piping. They have a maximum isolation time of 7 seconds and fail to the closed position upon loss of air or power.

These valves do not perform a safety function in the open position. They open to allow a purge to be applied to the guide tubes and indexing mechanisms in order to prevent internal corrosion due to condensation. This is not required for safe shutdown of the Reactor or for accident mitigation.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
6. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems
7. Design Baseline Document L-S-20, Neutron Monitoring System

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: Instrument Gas Supply to Vacuum Relief Valves - Outboard PCIV

ID Nos.: HV-59-135, HV-59-235

P&ID/COORD (respectively): M-59 (SHT 1) / B-5, M-59 (SHT 3) / B-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** AO

Positions: Normal_O_ Safety_C_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open, air-operated valves are located in the nonessential instrument gas supply line to the primary containment vacuum relief valve assemblies and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as outboard containment isolation valves for Penetration X-218. As such, they must be capable of automatic closure upon receipt of a Group VIIA containment isolation signal to maintain containment integrity upon loss of the attached non-Code Instrument Gas piping. They have a maximum isolation time of 7 seconds and fail to the closed position upon loss of air or power.

These valves do not perform a safety function in the open position. Instrument gas is supplied to the vacuum relief valve air operators to facilitate periodic exercising for verification of valve operability only. The air operators are not required for the vacuum relief valve assemblies to perform any required safety function.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
6. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems
7. Design Baseline Document L-S-25A, Primary Containment Pressure Suppression System

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: Instrument Air to Instrument Gas Bypass Barrier Block Valves

ID Nos.: HV-59-140, HV-59-141, HV-59-240, HV-59-241

P&ID/COORD (respectively): M-59 (SHT 2) / G-5 G-4, M-59 (SHT 4) / G-5, G-4

Code Class: NC **Category:** B **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal O Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks: Valves are Seismic Category I and Q-listed

Safety Function(s): These normally-open, motor-operated valves are located at the PCIG System interface with the Instrument Air System. They perform an active safety function in the closed position to prevent bypass leakage from the potentially contaminated PCIG System which could result in contamination of the Instrument Air System and a radiological release into the turbine enclosure. Although these valves are not primary containment isolation valves, they must be capable of automatic closure upon receipt of a Group VIIA containment isolation signal. They do not have a specified maximum design isolation time nor are they required to limit seat leakage to any specific maximum amount.

These valves do not perform a safety function in the open position. The Instrument Air System may be used as a backup to the PCIG System; however, this option would only be used when primary containment is deinerted due to the possible introduction of oxygen into the primary containment which may result in exceeding the Technical Specification allowable limits as a result of Instrument Air leakage.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
6. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: Instrument Air to Instrument Gas Bypass Barrier Vent Valves

ID Nos.: HV-59-142, HV-59-143, HV-59-242, HV-59-243

P&ID/COORD (respectively): M-59 (SHT 2) / H-5, H-6, M-59 (SHT 4) / H-5, H-6

Code Class: NC **Category:** B **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal C Safety O Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(O), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks: Valves are Seismic Category I and Q-listed

Safety Function(s): These normally-closed, motor-operated valves are located in vent lines on the Instrument Air (IA) side of the PGIC/IA Systems interface and perform an active safety function in the open position. The PCIG System is a potentially contaminated system. Therefore, these valves must be capable of automatically opening on a Group VIIA containment isolation signal which isolates the boundary valves HV-59-1(2)40 and HV-59-1(2)41 to allow potentially contaminated gases from the PCIG System to vent to the secondary containment atmosphere for processing by the Standby Gas Treatment System before release to the environment. . They do not have any specified maximum actuation time.

These valves do not perform a safety function in the closed position. During normal plant operation these valves remain closed to maintain operating pressure in the Instrument Air System.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
6. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: Long Term Nitrogen Supply Headers A and B to ADS Valves - Outboard PCIVs

ID Nos.: HV-59-151A, HV-59-151B, HV-59-251A, HV-59-251B

P&ID/COORD (respectively): M-59 (SHT 1) / G-5, H-5, M-59 (SHT 3) / G-5, H-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_O_ Safety_OC_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(O&C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open, motor-operated valves are located in the long term nitrogen supply lines to the ADS valve accumulators. They perform active safety functions in the open and closed positions.

These valves are identified in UFSAR Table 6.2.17 as outboard containment isolation valves for Penetrations X-27A and X-3D-2. As such, they must be capable of automatic closure upon receipt of a Group VIIC isolation signal to maintain containment integrity in the event of a depressurization of the long term nitrogen supply piping following an accident. They have a maximum isolation time of 45 seconds.

These valves must be capable of opening to allow flow from the safety grade nitrogen bottles to the ADS valve accumulators in the event that the non-safety grade PCIG System Compressors are unavailable. The nitrogen bottles are sized to provide an adequate amount of nitrogen to maintain ADS operation for seven days post-LOCA. Connections external to the primary containment are provided to allow additional bottles to be connected to support ADS operation for 100 days post-LOCA, thereby satisfying design requirements for ECCS operability.

The valve motor operators are powered from the Class 1E ac emergency power supply to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the open and closed positions
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
5. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
6. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: ADS Long Term Nitrogen Supply Headers A and B Pressure Relief Valves

ID Nos.: PSV-59-152A, PSV-59-152B, PSV-59-153A, PSV-59-153B
PSV-59-252A, PSV-59-252B, PSV-59-253A, PSV-59-253B

P&ID/COORD (respectively): M-59 (SHT 1) / F-7, H-7, F-7, H-7
M-59 (SHT 3) / F-7, H-7, F-7, H-7

Code Class: 3 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** RL **Act. Type:** SA

Positions: Normal C Safety OC Failsafe -

Test Frequency (Direction): RT-P3 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These relief valves are located on the long term nitrogen supply headers which provide a safety-related source of nitrogen to the ADS valve accumulators in the event of a loss of the PCIG Compressors. They perform an active safety function to provide overpressure protection to their respective headers. Since the pressure of the nitrogen bottles ranges from 2200 psig (new) to 800 psig (spent), failure of a regulator would result in an overpressure condition in the associated header. Failure of these relief valves to lift during an overpressure condition could result in a ruptured line, thereby jeopardizing the long term post-accident operability of the associated ADS valves. Their failure to reseat could result in depletion of the safety-related nitrogen supply.

Test Requirement(s):

Relief valve test once every 10 years

Reference(s):

1. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
2. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: Instrument Gas to ADS Headers A and B Isolation Valves

ID Nos.: SV-59-150A, SV-59-150B, SV-59-250A, SV-59-250B

P&ID/COORD (respectively): M-59 (SHT 1) / G-6, H-6, M-59 (SHT 3) / G-6, H-6

Code Class: 3 **Category:** B **Active/Passive:** A a

Size: 1.00 **Valve Type:** GL **Act. Type:** SO

Positions: Normal_O_ Safety_C_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open, solenoid-operated valves are located in the PCIG supply headers to the ADS valve accumulators and perform an active safety function in the closed position. They must be capable of automatic closure when a low pressure condition is sensed in the PCIG System piping or upon loss of power in order to prevent the diversion of nitrogen to the non-Code, Seismic IIA portion of the PCIG System. Operability of the long term nitrogen supply system is required to provide an adequate amount of nitrogen to maintain ADS operation following a LOCA.

These valves do not perform a safety function in the open position. They are normally open during plant operation to allow the PCIG Compressors to maintain pressure in the ADS valve accumulators.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
2. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems
3. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 4.2.2

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: ADS Long Term Nitrogen Supply System Headers A and B Isolation Valves

ID Nos.: SV-59-152A, SV-59-152B, SV-59-252A, SV-59-252B

P&ID/COORD (respectively): M-59 (SHT 1) / F-6, H-6, M-59 (SHT 3) / F-6, H-6

Code Class: 3 **Category:** B **Active/Passive:** A

Size: 1.00 **Valve Type:** GL **Act. Type:** SO

Positions: Normal_C_ Safety_O_ Failsafe_O_

Test Frequency (Direction): ET-Q, FS-Q(O), ST-Q(O), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-closed, solenoid-operated valves are located in the long term nitrogen supply system headers to the ADS valve accumulators and perform an active safety function in the open position. They must be capable of opening automatically when a low pressure condition is sensed in the PCIG System piping or upon loss of power in order to align the nitrogen bottles to the ADS accumulators. Nitrogen bottle pressure is maintained between 2200 psig (new) and 800 psig (spent) in order to assure long term operability of the ADS valves following an accident.

These valves do not perform a safety function in the closed position. They are normally closed during plant operation to maintain the long term nitrogen supply system in standby condition.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the open position
Quarterly stroke time test to the open position
Position indication verification once every two years

Reference(s):

1. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
2. Design Baseline Document L-S-18, Instrument Air and Nitrogen Systems
3. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 4.2.2

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: TIP Guide Tube Explosive Valve

ID Nos.: XV-59-140A, XV-59-140B, XV-59-140C, XV-59-140D, XV-59-140E, XV-59-240A, XV-59-240B, XV-59-240C, XV-59-240D, XV-59-240E

P&ID/COORD (respectively): M-59 (SHT 1) / D-6 , M-59 (SHT 3) / D-6

Code Class: 2 **Category:** D **Active/Passive:** A

Size: .375 **Valve Type:** EX **Act. Type:** EX

Positions: Normal_O_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): XT-P5 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally-open, explosive-actuated shear valves are located in the Traversing Incore Probe (TIP) System guide tubes and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as outboard containment isolation valves for Penetrations X-35C,D,E,F & G. As such, they must be capable of closure by remote manual switch actuation in the event that a TIP fails to retract or a ball valve sticks open when containment isolation is required. Shear valve actuation would be required only in the event that the associated ball valve failed to isolate. In this event, the shear valve would be operated from the Control Room to cut the cable and seal the guide tube. It is not practicable to leak test the shear valves because squib firing is required for valve closure.

These valves do not perform a safety function in the open position. They are normally open to allow passage of the TIP assembly and drive cable for incore monitoring and flux mapping during power operation. The TIP System is not required to perform any specific function for safe shutdown or accident mitigation.

Test Requirement(s):

Explosive valve test per T.S. 4.6.3.5.b and applicable ASME Code requirements

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.4, Containment Isolation System
3. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
4. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
5. Design Baseline Document L-S-20, Neutron Monitoring System

System (No): Primary Containment Instrument Gas (PCIG) System (59)

Component Description: TIP Guide Tube Ball Isolation Valve - Inboard PCIV

ID Nos.: XV-59-141A, XV-59-141B, XV-59-141C, XV-59-141D, XV-59-141E
XV-59-241A, XV-59-241B, XV-59-241C, XV-59-241D, XV-59-241E

P&ID/COORD (respectively): M-59 (SHT 1) / D-6, M-59 (SHT 3) / D-6

Code Class: 2 **Category:** A **Active/Passive:** A

Size: .375 **Valve Type:** BL **Act. Type:** SO

Positions: Normal_OC_ Safety_C_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These-normally closed, solenoid-operated ball valves are located in the Traversing Incore Probe (TIP) System guide tubes and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as inboard containment isolation valves for Penetrations X-35C,D,E,F & G. As such, they must be capable of automatic closure to maintain containment integrity when the TIP is fully retracted. Upon receipt of a Group VIIIB containment isolation signal, the TIP drive mechanism is automatically signaled to retract the TIP. As the TIP is withdrawn into its shield chamber, a position switch signals these valves to close. The ball valve opens against spring pressure and fails closed on loss of power.

These valves do not perform a safety function in the open position. They are opened periodically (approximately 4 hours per month) to allow passage of the TIP assembly and drive cable for incore monitoring and flux mapping during power operation. The TIP System is not required to perform any specific function for safe shutdown or accident mitigation.

The stems of these valves are visually inaccessible due to the solenoid actuators. The vendor-recommended procedure for performing remote position indication verification testing is identical to the stroke time test procedure performed on these valves quarterly. Therefore, a separate position indication verification test is not required.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.4, Containment Isolation System
3. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
4. UFSAR Section 9.3.1.3, Primary Containment Instrument Gas System
5. Design Baseline Document L-S-20, Neutron Monitoring System

PRIMARY CONTAINMENT LEAK TESTING (PCLT) SYSTEM

System (No): Primary Containment Leak Testing (PCLT) System (60)

Component Description: Drywell ILRT Skid Isolation Valve - PCIV

ID Nos.: 60-1057, 60-1058, 60-2057, 60-2058

P&ID/COORD (respectively): M-60 (SHT 1) / F-4, F-4, M-60 (SHT 2) / F-4, F-4

Code Class: 2 **Category:** A **Active/Passive:** P

Size: 0.75 **Valve Type:** GL **Act. Type:** MA

Positions: Normal LC Safety C Failsafe -

Test Frequency (Direction): LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally locked closed, manual valves are located in primary containment penetration piping from the drywell to the ILRT data acquisition skid and perform a passive safety function in the closed position They are identified in UFSAR Table 6.2 as containment isolation valves for Penetration X-40G-1. As such, they are required to limit seat leakage in order to maintain containment integrity.
These valves do not perform a safety function in the open position. They are opened only during the performance of an integrated leak rate test (ILRT). The ILRT is defined in 10 CFR 50, Appendix J as a Type A test and is performed to determine the total leakage from the containment atmosphere. Since these valves are open during the Type A test, they receive an Appendix J, Type C local leak rate test (LLRT).

Test Requirement(s):

Seat leakage testing per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.6, Primary Reactor Containment Leakage Rate Testing
3. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
4. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Primary Containment Leak Testing (PCLT) System (60)

Component Description: Drywell ILRT Skid Isolation Valve - PCIV

ID Nos.: 60-1070, 60-1071, 60-2070, 60-2071

P&ID/COORD (respectively): M-60 (SHT 1) / D-4, D-4, M-60 (SHT 2) / D-4, D-4

Code Class: 2 **Category:** A **Active/Passive:** P

Size: 0.75 **Valve Type:** GL **Act. Type:** MA

Positions: Normal LC Safety C Failsafe -

Test Frequency (Direction): LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally locked closed, manual valves are located in primary containment penetration piping from the drywell to the ILRT data acquisition skid and perform a passive safety function in the closed position They are identified in UFSAR Table 6.2 as containment isolation valves for Penetration X-40G-2. As such, they are required to limit seat leakage in order to maintain containment integrity.
These valves do not perform a safety function in the open position. They are opened only during the performance of an integrated leak rate test (ILRT). The ILRT is defined in 10 CFR 50, Appendix J as a Type A test and is performed to determine the total leakage from the containment atmosphere. Since these valves are open during the Type A test, they receive an Appendix J, Type C local leak rate test (LLRT).

Test Requirement(s):

Seat leakage testing per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.6, Primary Reactor Containment Leakage Rate Testing
3. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
4. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

System (No): Primary Containment Leak Testing (PCLT) System (60)

Component Description: Drywell ILRT Skid Isolation Valve - PCIV

ID Nos.: 60-1073, 60-1074, 60-2073, 60-2074

P&ID/COORD (respectively): M-60 (SHT 1) / C-4, C-4, M-60 (SHT 2) / C-4, C-4

Code Class: 2 **Category:** A **Active/Passive:** P

Size: 0.75 **Valve Type:** GL **Act. Type:** MA

Positions: Normal LC Safety C Failsafe -

Test Frequency (Direction): LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally locked closed, manual valves are located in primary containment penetration piping from the Suppression Chamber to the ILRT data acquisition skid and perform a passive safety function in the closed position They are identified in UFSAR Table 6.2 as containment isolation valves for Penetration X-227. As such, they are required to limit seat leakage in order to maintain containment integrity. These valves do not perform a safety function in the open position. They are opened only during the performance of an integrated leak rate test (ILRT). The ILRT is defined in 10 CFR 50, Appendix J as a Type A test and is performed to determine the total leakage from the containment atmosphere. Since these valves are open during the Type A test, they receive an Appendix J, Type C local leak rate test (LLRT).

Test Requirement(s):

Seat leakage testing per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.6, Primary Reactor Containment Leakage Rate Testing
3. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
4. Design Baseline Document L-S-25B, Primary Containment Auxiliary Systems

LIQUID RADWASTE COLLECTION

System (No): Liquid Radwaste Collection System (61)

Component Description: Drywell Floor Drain Sump/Equipment Drain Tank Vent Valve

ID Nos.: HV-61-102

P&ID/COORD (respectively): M-61 (SHT 1) / H-4

Code Class: 2 **Category:** N/A **Active/Passive:** N/A

Size: 1.50 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_LC_ Safety_N/A_ Failsafe_AI_

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): This locked-closed, motor-operated valve is located in an abandoned vent line from the Drywell Floor Drain Sump and the Drywell Equipment Drain Tank. The circuit breaker for this valve is de-energized and the line is capped outboard of the valve. The valve is rendered inoperable and the containment leakage pathway sealed by the locked closed valve and the capped line. Leak tightness of the line is verified during the integrated leak rate test. No further testing will be performed. This valve has no Unit 2 counterpart.

Test Requirement(s):

No testing requirements

Reference(s):

1. LGS Technical Specification 3/4.6.3
2. P&ID M-61, Sht 1, Liquid Radwaste Collection
3. Design Baseline Document L-S-34, Radwaste System

System (No): Liquid Radwaste Collection System (61)

Component Description: Drywell Floor Drain Sump Discharge Isolation Valve - Inboard PCIVs

ID Nos.: HV-61-110, HV-61-210

P&ID/COORD (respectively): M-61 (SHT 1) / F-5, M-61 (SHT 4) / F-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 4.00 **Valve Type:** GT **Act. Type:** AO

Positions: Normal_O_ Safety_C_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally open, fail-closed, air-operated valves are located in the drain line from the Drywell Floor Drain Sump Tank and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as inboard containment isolation valves for Penetration X-231A. As such, they must be capable of automatic closure upon receipt of a Group VIIIB containment isolation signal to maintain containment integrity. These valves require leak rate testing. However, due to the presence of a water seal, their seat leakage shall not be counted against the $0.6L_a$ containment leak rate limit. They have a maximum isolation time of 30 seconds and fail to the closed position upon a loss of air or electric power.

These valves do not perform a safety function in the open position. They remain open during normal plant operation to allow accumulation in the Drywell Floor Drain Sump Tank to be discharged to the Floor Drain Collection Tank. This function is not required for safe shutdown or accident mitigation.

These valves receive their control power from the Class 1E ac emergency power system to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Tables 3.3.2-1 and 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 5.2.5.2.1.3, Drywell Sump Level Monitoring
4. UFSAR Section 6.2.3.2.3.1, Water Seals
5. UFSAR Section 6.2.4, Containment Isolation System
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 11.2, Liquid Waste Management System
8. Design Baseline Document L-S-34, Radwaste System

System (No): Liquid Radwaste Collection System (61)

Component Description: Drywell Floor Drain Sump Discharge Isolation Valve - Outboard PCIVs

ID Nos.: HV-61-111, HV-61-211

P&ID/COORD (respectively): M-61 (SHT 1) / F-4, M-61 (SHT 4) / F-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 4.00 **Valve Type:** GT **Act. Type:** AO

Positions: Normal OC Safety C Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed, fail-closed, air-operated valves are located in the drain line from the Drywell Floor Drain Sump Tank and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as outboard containment isolation valves for Penetration X-231A. As such, they must be capable of automatic closure upon receipt of a Group VIIIB containment isolation signal to maintain containment integrity. These valves require leak rate testing. However, due to the presence of a water seal, their seat leakage shall not be counted against the $0.6L_a$ containment leak rate limit. They have a maximum isolation time of 30 seconds and fail to the closed position upon a loss of air or electric power.

These valves do not perform a safety function in the open position. They receive an open signal from level switches in the Drywell Floor Drain Sump Tank and remain open until tank level has decreased to a lower setpoint value. This function allows accumulation in the Drywell Floor Drain Sump Tank to be discharged to the Floor Drain Collection Tank. This function is not required for safe shutdown or accident mitigation.

These valves receive their control power from the Class 1E ac emergency power system to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Tables 3.3.2-1 and 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 5.2.5.2.1.3, Drywell Sump Level Monitoring
4. UFSAR Section 6.2.3.2.3.1, Water Seals
5. UFSAR Section 6.2.4, Containment Isolation System
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 11.2, Liquid Waste Management System
8. Design Baseline Document L-S-34, Radwaste System

System (No): Liquid Radwaste Collection System (61)

Component Description: Drywell Floor Drain Sump Level Instrumentation Isolation Valve - Outboard PCIVs

ID Nos.: HV-61-112, HV-61-212

P&ID/COORD (respectively): M-61 (SHT 1) / G-4, M-61 (SHT 4) / G-4

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 1.50 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_O_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These valves provide isolation for the Drywell Floor Drain Sump level transmitters, and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as containment isolation valves for Penetration X-230B. As such, they must be capable of closure by remote manual switch actuation from the Control Room to maintain containment integrity in the event of a loss of the instrument loop. Leak tightness of the penetration is verified during the Type A test. Type C testing is not required. They have a maximum isolation time of 45 seconds.

These valves do not receive an automatic isolation signal for containment isolation, but remain open to assist in the monitoring of conditions inside primary containment following an accident. This monitoring function satisfies concerns identified in Regulatory Guide 1.97. Although the level in the drain sumps can provide indication of a LOCA, the indication is not conclusive because there can be water in the sumps during normal operation. A small line break will cause drywell pressure to increase before a noticeable increase in the sump level. Therefore, the drywell sumps will provide a "lagging" versus "early" indication of an RCS leak. Additionally, the drywell sump level signals neither automatically initiate safety related systems nor alert the operator to take action. Both sumps have level detectors that provide only non-safety indications.

The valve operators receive their control power from the Class 1E ac emergency power system to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.3.7
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 5.2.5.2.1.3, Drywell Sump Level Monitoring
4. UFSAR Section 6.2.4, Containment Isolation System
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.5.2.5.1.1.2.4.3, Variables B8 and C6 - Drywell Sump Level (B8) and Drywell Drain Sump Level
7. UFSAR Section 11.2, Liquid Waste Management System
8. Design Baseline Document L-S-34, Radwaste System
9. Design Baseline Document L-T-16, Regulatory Guide 1.97 - Post-Accident Monitoring

System (No): Liquid Radwaste Collection System (61)

Component Description: Drywell Equipment Drain Tank Discharge Isolation Valve - Inboard PCIVs

ID Nos.: HV-61-130, HV-61-230

P&ID/COORD (respectively): M-61 (SHT 1) / B-5, M-61 (SHT 4) / B-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 4.00 **Valve Type:** GT **Act. Type:** AO

Positions: Normal_O_ Safety_C_ Failsafe_C_

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally open, fail-closed, air-operated valves are located in the drain line from the Drywell Equipment Drain Tank and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as inboard containment isolation valves for Penetration X-231B. As such, they must be capable of automatic closure upon receipt of a Group VIIIB containment isolation signal to maintain containment integrity. These valves require leak rate testing. However, due to the presence of a water seal, their seat leakage shall not be counted against the $0.6L_a$ containment leak rate limit. They have a maximum isolation time of 30 seconds and fail to the closed position upon a loss of air or electric power.

These valves do not perform a safety function in the open position. They remain open during normal plant operation to allow accumulation in the Drywell Equipment Drain Tank to be discharged to the Floor Drain Collection Tank. This function is not required for safe shutdown or accident mitigation.

These valves receive their control power from the Class 1E ac emergency power system to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Tables 3.3.2-1 and 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 5.2.5.2.1.3, Drywell Sump Level Monitoring
4. UFSAR Section 6.2.3.2.3.1, Water Seals
5. UFSAR Section 6.2.4, Containment Isolation System
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 11.2, Liquid Waste Management System
8. Design Baseline Document L-S-34, Radwaste System

System (No): Liquid Radwaste Collection System (61)

Component Description: Drywell Equipment Drain Tank Discharge Isolation Valve - Outboard PCIVs

ID Nos.: HV-61-131, HV-61-231

P&ID/COORD (respectively): M-61 (SHT 1) / B-4, M-61 (SHT 4) / B-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 4.00 **Valve Type:** GT **Act. Type:** AO

Positions: Normal OC Safety C Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(C), LJ-B, PI-T **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These normally closed, fail-closed, air-operated valves are located in the drain line from the Drywell Equipment Drain Tank and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as outboard containment isolation valves for Penetration X-231B. As such, they must be capable of automatic closure upon receipt of a Group VIIIB containment isolation signal to maintain containment integrity. These valves require leak rate testing. However, due to the presence of a water seal, their seat leakage shall not be counted against the $0.6L_a$ containment leak rate limit. They have a maximum isolation time of 30 seconds and fail to the closed position upon a loss of air or electric power.

These valves do not perform a safety function in the open position. They receive an open signal from level switches in the Drywell Equipment Drain Tank and remain open until tank level has decreased to a lower setpoint value. This function allows accumulation in the Drywell Equipment Drain Tank to be discharged to the Floor Drain Collection Tank. This function is not required for safe shutdown or accident mitigation.

These valves receive their control power from the Class 1E ac emergency power system to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Tables 3.3.2-1 and 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 5.2.5.2.1.3, Drywell Sump Level Monitoring
4. UFSAR Section 6.2.3.2.3.1, Water Seals
5. UFSAR Section 6.2.4, Containment Isolation System
6. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
7. UFSAR Section 11.2, Liquid Waste Management System
8. Design Baseline Document L-S-34, Radwaste System

System (No): Liquid Radwaste Collection System (61)

Component Description: Drywell Equipment Drain Tank Level Instrumentation Isolation Valve - Outboard PCIVs

ID Nos.: HV-61-132, HV-61-232

P&ID/COORD (respectively): M-61 (SHT 1) / C-4, M-61 (SHT 4) / C-5

Code Class: 2 **Category:** B **Active/Passive:** A

Size: 1.50 **Valve Type:** GL **Act. Type:** MO

Positions: Normal_O_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These valves provide isolation for the Drywell Equipment Drain Tank level transmitters, and perform an active safety function in the closed position. They are identified in UFSAR Table 6.2-17 as containment isolation valves for Penetration X-230B. As such, they must be capable of closure by remote manual switch actuation from the Control Room to maintain containment integrity in the event of a loss of the instrument loop. Leak tightness of the penetration is verified during the Type A test. Type C testing is not required. They have a maximum isolation time of 45 seconds.

These valves do not receive an automatic isolation signal for containment isolation, but remain open to assist in the monitoring of conditions inside primary containment following an accident. This monitoring function satisfies concerns identified in Regulatory Guide 1.97. Although the level in the drain sumps can provide indication of a LOCA, the indication is not conclusive because there can be water in the sumps during normal operation. A small line break will cause drywell pressure to increase before a noticeable increase in the sump level. Therefore, the drywell sumps will provide a "lagging" versus "early" indication of an RCS leak. Additionally, the drywell sump level signals neither automatically initiate safety related systems nor alert the operator to take action. Both sumps have level detectors that provide only non-safety indications.

The valve operators receive their control power from the Class 1E ac emergency power system to ensure operability during a loss of offsite power.

Test Requirement(s):

Quarterly full stroke exercise test
Quarterly stroke time test to the closed position
Position indication verification once every two years

Reference(s):

1. LGS Technical Specification 3/4.3.7
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 5.2.5.2.1.3, Drywell Sump Level Monitoring
4. UFSAR Section 6.2.4, Containment Isolation System
5. UFSAR Tables 6.2-17, and 6.2-25, Containment Penetration Data
6. UFSAR Section 7.5.2.5.1.1.2.4.3, Variables B8 and C6 - Drywell Sump Level (B8) and Drywell Drain Sump Level
7. UFSAR Section 11.2, Liquid Waste Management System
8. Design Baseline Document L-S-34, Radwaste System
9. Design Baseline Document L-T-16, Regulatory Guide 1.97 - Post-Accident Monitoring

DRYWELL CHILLED WATER SYSTEM (DCWS)

System (No): Drywell Chilled Water System (DCWS) (87)

Component Description: Loop A Drywell/Reactor Building Chilled Cooling Water Supply Isolation Valves - Inboard/Outboard PCIVs

ID Nos.: HV-87-120A, HV-87-128, HV-87-220A, HV-87-228

P&ID/COORD (respectively): M-87 (SHT 4) / C-4, C-5, M-87 (SHT 9) / C-4, C-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 8.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T, LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally open Loop A DCWS supply valves to the Drywell Unit Coolers perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as containment isolation valves for Penetration X-53. As such, they must be capable of automatic closure upon receipt of a containment isolation signal to maintain containment integrity. They have a maximum isolation time of 60 seconds.

These valves do not perform a safety function in the open position. They are capable of opening by remote manual switch, if closed for containment isolation, to maintain continuity in normal drywell cooling. However, their ability to open is not required for accident mitigation. The Drywell Unit Coolers perform the safety related function of maintaining the drywell atmosphere in a thoroughly mixed condition after a LOCA to prevent stratification of the hydrogen and oxygen that may be generated. However, Chilled Water supply to the unit coolers is not needed for this function.

The valve motor operators receive their control power from separate Class 1E ac emergency buses to assure operability during a loss of offsite power.

Test Requirement(s):

Quarterly exercise test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 9.2.10.1, Drywell Chilled Water System
6. UFSAR Section 9.4.5.2, Drywell Air Cooling System
7. Design Baseline Document L-S-08F, Drywell HVAC System
8. Design Baseline Document L-S-29, Chilled Water System

System (No): Drywell Chilled Water System (DCWS) (87)

Component Description: Loop B Drywell/Reactor Building Chilled Cooling Water Supply Isolation Valves - Inboard/Outboard PCIVs

ID Nos.: HV-87-120B, HV-87-122, HV-87-220B, HV-87-222

P&ID/COORD (respectively): M-87 (SHT 4) / B-4, B-5, M-87 (SHT 9) / B-4, B-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 8.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T, LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The Loop B DCWS supply valves to the Drywell Unit Coolers perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as containment isolation valves for Penetration X-55. As such, they must be capable of automatic closure upon receipt of a containment isolation signal to maintain containment integrity. They have a maximum isolation time of 60 seconds.

These valves do not perform a safety function in the open position. They are capable of opening by remote manual switch, if closed for containment isolation, to maintain continuity in normal drywell cooling. However, their ability to open is not required for accident mitigation. The Drywell Unit Coolers perform the safety related function of maintaining the drywell atmosphere in a thoroughly mixed condition after a LOCA to prevent stratification of the hydrogen and oxygen that may be generated. However, Chilled Water supply to the unit coolers is not needed for this function.

The valve motor operators receive their control power from separate Class 1E ac emergency buses to assure operability during a loss of offsite power.

Test Requirement(s):

Quarterly exercise test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 9.2.10.1, Drywell Chilled Water System
6. UFSAR Section 9.4.5.2, Drywell Air Cooling System
7. Design Baseline Document L-S-08F, Drywell HVAC System
8. Design Baseline Document L-S-29, Chilled Water System

System (No): Drywell Chilled Water System (DCWS) (87)

Component Description: Loop A Drywell Chilled Cooling Water Return Isolation Valves - Inboard/Outboard PCIVs

ID Nos.: HV-87-121A, HV-87-129, HV-87-221A, HV-87-229

P&ID/COORD (respectively): M-87 (SHT 4) / C-4, C-5, M-87 (SHT 9) / C-4, C-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 8.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal OC Safety C Failsafe AI

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T, LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally open Loop A DCWS return valves from the Drywell Unit Coolers perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as containment isolation valves for Penetration X-54. As such, they must be capable of automatic closure upon receipt of a containment isolation signal to maintain containment integrity. They have a maximum isolation time of 60 seconds.

These valves do not perform a safety function in the open position. They are capable of opening by remote manual switch, if closed for containment isolation, to maintain continuity in normal drywell cooling. However, their ability to open is not required for accident mitigation. The Drywell Unit Coolers perform the safety related function of maintaining the drywell atmosphere in a thoroughly mixed condition after a LOCA to prevent stratification of the hydrogen and oxygen that may be generated. However, Chilled Water supply to the unit coolers is not needed for this function.

The valve motor operators receive their control power from separate Class 1E ac emergency buses to assure operability during a loss of offsite power.

Test Requirement(s):

Quarterly exercise test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 9.2.10.1, Drywell Chilled Water System
6. UFSAR Section 9.4.5.2, Drywell Air Cooling System
7. Design Baseline Document L-S-08F, Drywell HVAC System
8. Design Baseline Document L-S-29, Chilled Water System

System (No): Drywell Chilled Water System (DCWS) (87)

Component Description: Loop B Drywell Chilled Cooling Water Return Isolation Valves - Inboard/Outboard PCIVs

ID Nos.: HV-87-121B, HV-87-123, HV-87-221B, HV-87-223

P&ID/COORD (respectively): M-87 (SHT 4) / A-4, A-5, M-87 (SHT 9) / A-4, A-5

Code Class: 2 **Category:** A **Active/Passive:** A

Size: 8.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_OC_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): ET-Q, ST-Q(C), PI-T, LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The Loop B DCWS return valves from the Drywell Unit Coolers perform an active safety function in the closed position. They are identified in UFSAR Table 6.2.17 as containment isolation valves for Penetration X-56. As such, they must be capable of automatic closure upon receipt of a containment isolation signal to maintain containment integrity. They have a maximum isolation time of 60 seconds.

These valves do not perform a safety function in the open position. They are capable of opening by remote manual switch, if closed for containment isolation, to maintain continuity in normal drywell cooling. However, their ability to open is not required for accident mitigation. The Drywell Unit Coolers perform the safety related function of maintaining the drywell atmosphere in a thoroughly mixed condition after a LOCA to prevent stratification of the hydrogen and oxygen that may be generated. However, Chilled Water supply to the unit coolers is not needed for this function.

The valve motor operators receive their control power from separate Class 1E ac emergency buses to assure operability during a loss of offsite power.

Test Requirement(s):

Quarterly exercise test to the closed position
Quarterly stroke time test to the closed position
Position indication verification once every two years
Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 9.2.10.1, Drywell Chilled Water System
6. UFSAR Section 9.4.5.2, Drywell Air Cooling System
7. Design Baseline Document L-S-08F, Drywell HVAC System
8. Design Baseline Document L-S-29, Chilled Water System

System (No): Drywell Chilled Water System (DCWS) (87)

Component Description: Loop A Drywell RECW Return Isolation Valves - Outboard PCIVs

ID Nos.: HV-87-124A, HV-87-224A

P&ID/COORD (respectively): M-87 (SHT 4) / B-4, M-87 (SHT 9) / B-4

Code Class: 2 **Category:** A **Active/Passive:** P

Size: 8.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_LC_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally locked-closed Loop A RECW return valves from the Drywell Unit Coolers perform a passive safety function in the closed position. They are identified in UFSAR Table 6.2.17 as containment isolation valves for Penetration X-54. As such, they must be capable of limiting seat leakage in order to maintain containment integrity. They are deenergized and administratively controlled in the closed position to prevent their opening whenever containment integrity is required. If energized during refuelings, administrative controls are used to prevent disk movement subsequent to seat leakage testing to ensure valves are "as left" in the closed position prior to restart. Position indication is not available for these valves when deenergized; therefore, position indication verification testing is not required.

These valves do not perform any safety function in the open position. They may be opened at the operator's discretion during plant Modes when containment integrity is not required to provide backup to the DCWS. However, neither the RECW nor the DCWS are required for safe shutdown or accident mitigation.

Test Requirement(s):

Seat leakage rate per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 9.2.10.1, Drywell Chilled Water System
6. UFSAR Section 9.4.5.2, Drywell Air Cooling System
7. Design Baseline Document L-S-08F, Drywell HVAC System
8. Design Baseline Document L-S-29, Chilled Water System
9. NCR LG 94-00254, Rev. 1

System (No): Drywell Chilled Water System (DCWS) (87)

Component Description: Loop B Drywell RECW Return Isolation Valves - Outboard PCIVs

ID Nos.: HV-87-124B, HV-87-224B

P&ID/COORD (respectively): M-87 (SHT 4) / A-4, M-87 (SHT 9) / A-4

Code Class: 2 **Category:** A **Active/Passive:** P

Size: 8.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_LC_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally locked-closed Loop B RECW return valves from the Drywell Unit Coolers perform a passive safety function in the closed position. They are identified in UFSAR Table 6.2.17 as containment isolation valves for Penetration X-56. As such, they must be capable of limiting seat leakage in order to maintain containment integrity. They are deenergized and administratively controlled in the closed position to prevent their opening whenever containment integrity is required. If energized during refuelings, administrative controls are used to prevent disk movement subsequent to seat leakage testing to ensure valves are "as left" in the closed position prior to restart. Position indication is not available for these valves when deenergized; therefore, position indication verification testing is not required.

These valves do not perform any safety function in the open position. They may be opened at the operator's discretion during plant Modes when containment integrity is not required to provide backup to the DCWS. However, neither the RECW nor the DCWS are required for safe shutdown or accident mitigation.

Test Requirement(s):

Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 9.2.10.1, Drywell Chilled Water System
6. UFSAR Section 9.4.5.2, Drywell Air Cooling System
7. Design Baseline Document L-S-08F, Drywell HVAC System
8. Design Baseline Document L-S-29, Chilled Water System
9. NCR LG 94-00254, Rev. 1

System (No): Drywell Chilled Water System (DCWS) (87)

Component Description: Loop A Drywell/Reactor RECW Supply Isolation Valves - Outboard PCIVs

ID Nos.: HV-87-125A, HV-87-225A

P&ID/COORD (respectively): M-87 (SHT 4) / C-4, M-87 (SHT 9) / C-4

Code Class: 2 **Category:** A **Active/Passive:** P

Size: 8.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal LC Safety C Failsafe AI

Test Frequency (Direction): LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally locked-closed Loop A RECW supply valves to the Drywell Unit Coolers perform a passive safety function in the closed position. They are identified in UFSAR Table 6.2.17 as containment isolation valves for Penetration X-53. As such, they must be capable of limiting seat leakage in order to maintain containment integrity. They are deenergized and administratively controlled in the closed position to prevent their opening whenever containment integrity is required. If energized during refuelings, administrative controls are used to prevent disk movement subsequent to seat leakage testing to ensure valves are "as left" in the closed position prior to restart. Position indication is not available for these valves when deenergized; therefore, position indication verification testing is not required.

These valves do not perform any safety function in the open position. They may be opened at the operator's discretion during plant Modes when containment integrity is not required to provide backup to the DCWS. However, neither the RECW nor the DCWS are required for safe shutdown or accident mitigation.

Test Requirement(s):

Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 9.2.10.1, Drywell Chilled Water System
6. UFSAR Section 9.4.5.2, Drywell Air Cooling System
7. Design Baseline Document L-S-08F, Drywell HVAC System
8. Design Baseline Document L-S-29, Chilled Water System
9. NCR LG 94-00254 Rev. 1

System (No): Drywell Chilled Water System (DCWS) (87)

Component Description: Loop B Drywell/Reactor RECW Supply Isolation Valves - Outboard PCIVs

ID Nos.: HV-87-125B, HV-87-225B

P&ID/COORD (respectively): M-87 (SHT 4) / B-4, M-87 (SHT 9) / B-4

Code Class: 2 **Category:** A **Active/Passive:** P

Size: 8.00 **Valve Type:** GT **Act. Type:** MO

Positions: Normal_LC_ Safety_C_ Failsafe_AI_

Test Frequency (Direction): LJ-B **Appendix J, Type C:** Y

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The normally locked-closed Loop B RECW supply valves to the Drywell Unit Coolers perform a passive safety function in the closed position. They are identified in UFSAR Table 6.2.17 as containment isolation valves for Penetration X-55. As such, they must be capable of limiting seat leakage in order to maintain containment integrity. They are deenergized and administratively controlled in the closed position to prevent their opening whenever containment integrity is required. If energized during refuelings, administrative controls are used to prevent disk movement subsequent to seat leakage testing to ensure valves are "as left" in the closed position prior to restart. Position indication is not available for these valves when deenergized; therefore, position indication verification testing is not required.

These valves do not perform any safety function in the open position. They may be opened at the operator's discretion during plant Modes when containment integrity is not required to provide backup to the DCWS. However, neither the RECW nor the DCWS are required for safe shutdown or accident mitigation.

Test Requirement(s):

Seat leakage rate test per 10 CFR 50, Appendix J (Option B)

Reference(s):

1. LGS Technical Specification Table 3.3.2-2
2. LGS Technical Specification 3/4.6.3
3. UFSAR Section 6.2.4, Containment Isolation System
4. UFSAR Table 6.2-17, Containment Penetration Data
5. UFSAR Section 9.2.10.1, Drywell Chilled Water System
6. UFSAR Section 9.4.5.2, Drywell Air Cooling System
7. Design Baseline Document L-S-08F, Drywell HVAC System
8. Design Baseline Document L-S-29, Chilled Water System
9. NCR LG 94-00254 Rev. 1

System (No): Drywell Chilled Water System (DCWS) (87)

Component Description: Excess Flow Check Valves for Clg Wtr Flow Transmitter to Recirc Pump Motor Air Cooler - FT-87-1(2)57A,B,C&D

ID Nos.: XV-87-156A, XV-87-156B, XV-87-157A, XV-87-157B, XV-87-256A, XV-87-256B, XV-87-257A, XV-87-257B

P&ID/COORD (respectively): M-87 (SHT 5) / H-1, D-2, G-1, D-2, M-87 (SHT 10) / H-1, D-2, G-1, D-2

Code Class: 2 **Category:** C **Active/Passive:** A

Size: 1.00 **Valve Type:** XC **Act. Type:** SA

Positions: Normal_O_ Safety_C_ Failsafe_-_

Test Frequency (Direction): ET-R(F), PI-T **Appendix J, Type C:** N

VRR/VCS/ROJ: GVROJ-2

Remarks: Refueling outage justification GVROJ-2 allows functional testing of excess flow check valves to be performed at refueling.

Safety Function(s): Per Regulatory Guide 1.11 (Safety Guide 11), an excess flow check valve may satisfy the containment isolation criteria of 10CFR50, Appendix A (General Design Criteria 56). For instrument lines penetrating containment that are not part of the protection system, excess flow check valves are acceptable provided the instrument sensing lines are sized or orificed such that in the event of a postulated piping or component failure (1) they will close or be closed if the instrument line integrity outside containment is lost during normal reactor operation or under accident conditions, (2) leakage is reduced to the maximum extent practical consistent with other safety requirements, (3) the integrity and performance of the secondary containment and associated safety systems will be maintained, (4) the potential offsite exposure will be substantially less than 10 CFR 100 limits and (5) the status of all such isolation valves should be indicated in the control room. Instrument lines penetrating or connected to primary reactor containment should be conservatively designed up to and including the isolation valve and of a quality at least equivalent to the containment.

These normally-open 1 inch excess flow check valves are located in instrument lines which connect to a closed cooling water system inside containment and have an active safety function in the closed position to provide containment isolation. The UFSAR stipulates that instrument lines that penetrate the primary containment which do not connect to the Reactor Coolant Pressure Boundary conform to Reg. Guide 1.11 in that they are either equipped with an EFCV or an isolation valve capable of remote operation from the Control Room, and are sized or orificed to meet the criteria outlined in Reg. Guide 1.11. This instrumentation loop provides alarm and indication in the Control Room of the Recirculation Pump motor air cooler chilled water flow to assess the operation of the Recirculation Pumps.

Test Requirements:

Exercise test in the forward direction during refueling outages.
Position indication verification at least once every 2 years

References:

1. LGS Technical Specification 3/4.6.3
2. UFSAR Section 6.2.4, Containment Isolation System
3. Regulatory Guide 1.11, Instrument Lines Penetrating Primary Reactor Containment
4. Design Baseline Document L-S-08F, Drywell HVAC System
5. Design Baseline Document L-S-29, Chilled Water System

CONTROL STRUCTURE CHILLED WATER SYSTEM (CSCWS)

System (No): Control Structure Chilled Water System (CSCWS) (90)

Component Description: Control Structure Chilled Water Circulation Pumps

ID Nos.: 0AP162, 0BP162

P&ID/COORD (respectively): M-90 (SHT 1) / E-4, F-2

Pump Type: Centrifugal **Test Parameters:** D/P, Q, V.

Relief Request: GPRR-2

Remarks: Relief request GPRR-2 provides for exemption from individual instrument accuracy and full-scale range requirements provided the applicable instrument(s) are accurate to at least ± 6% at the reference value.

Safety Function(s): The Control Structure Chilled Water System is common to Units 1 and 2 and performs the safety function of providing chilled water to various essential components which are required to mitigate the consequences of an accident. The CSCWS provides cooling water to the Control Room HVAC, The Emergency Switchgear and Battery Room HVAC, the Auxiliary Equipment Room HVAC, and the Standby Gas Treatment Room and Access Area HVAC. All of the cooling units supplied by CSCWS are required to remain operable during post-accident conditions to maintain ambient temperatures at acceptable levels. Additionally, the Control Room Unit Coolers are required to maintain habitability during Control Room isolation. The CSCWS is designed with sufficient capacity and redundancy so that a single failure will not prevent the system from performing its required functions. The system is automatically initiated by starting any of the coolers supported by the system or may be manually initiated from the Control Room. The CSCWS Pumps will trip on a low circulating water flow signal, loss of power, or on a LOCA shutdown signal. After a LOCA trip, the pump in "RUN", will restart after a 16 second delay. The standby pump will start after a 129 second time delay unless auto-started earlier by one of its associated fan units.

The CSCWS Pumps must be capable of individually supplying a flow rate of 705 gpm to satisfy the safety function of the system. This flow rate is based on the heat removal requirements of each unit cooler, or cooling coil, for each component being cooled by the CSCWS.

Power is supplied to these pumps from the Class 1E emergency ac power system to ensure operability in the event of a loss of offsite power.

Test Requirement(s):

Quarterly Pump testing

References:

1. UFSAR Section 7.3, Engineered Safety Feature Systems
2. UFSAR Section 9.2.10.2, Control Structure Chilled Water System
3. Design Baseline Document L-S-08B, Control Room HVAC System
4. Design Baseline Document L-S-08C, Reactor Enclosure HVAC System
5. Design Baseline Document L-S-29, Chilled Water System

System (No): Control Structure Chilled Water System (CSCWS) (90)

Component Description: Control Structure Chilled Water Circulation Pumps Discharge Check Valves

ID Nos.: 90-0013A, 90-0013B

P&ID/COORD (respectively): M-90 (SHT 1) / F-3, F-2

Code Class: NC **Category:** C **Active/Passive:** A

Size: 6.00 **Valve Type:** CK **Act. Type:** SA

Positions: Normal_OC_ Safety_O_ Failsafe_-_

Test Frequency (Direction): ET-Q(F) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The Control Structure Chilled Water Pumps discharge check valves perform an active safety function in the open position. They must be capable of passing a flow rate of 705 gpm to satisfy the safety function of the system. This flow rate is based on the heat removal requirements of the Control Room HVAC, the Emergency Switchgear and Battery Room HVAC, the Auxiliary Equipment Room HVAC, and the Standby Gas Treatment Room and Access Area HVAC, which are required to remain operable during post-accident conditions to maintain ambient temperatures at acceptable levels. Additionally, the Control Room Unit Coolers are required to maintain habitability during Control Room isolation.

These check valves do not perform a safety function in the closed position. The Chilled Water Pumps discharge crosstie line contains manual valves which are maintained in the closed position. Therefore, there is no possibility of diverting the flow from an inservice pump through the adjacent idle pump.

Test Requirement(s):

Quarterly exercise test to the full open position

Reference(s):

1. UFSAR Section 7.3, Engineered Safety Feature Systems
2. UFSAR Section 9.2.10.2, Control Structure Chilled Water System
3. Design Baseline Document L-S-08B, Control Room HVAC System
4. Design Baseline Document L-S-08C, Reactor Enclosure HVAC System
5. Design Baseline Document L-S-29, Chilled Water System

System (No): Control Structure Chilled Water System (CSCWS) (90)

Component Description: Control Structure Water Chiller Evaporator Relief Valves

ID Nos.: PSV-90-048A, PSV-90-048B, PSV-90-049A, PSV-90-049B

P&ID/COORD (respectively): M-90 (SHT. 1) / B-8, B-5, B-8, B-5

Code Class: NC **Category:** C **Active/Passive:** A

Size: 1.00 (048s)
0.50 (049s) **Valve Type:** RL **Act. Type:** SA

Positions: Normal C Safety OC Failsafe -

Test Frequency (Direction): RT-P3 **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These relief valves are not ASME Class 1, 2, or 3. They do, however, perform a safety function in providing overpressure protection to the shell side of the Control Structure Water Chiller Evaporator. The chillers are required to maintain Control Room habitability and equipment operability during all modes of operation, including post-accident. The shell side of the evaporators are ASME Section VIII pressure vessels and are required by Article UG-125 to be provided with overpressure protection.

Test Requirement(s):

Relief valve test once every 10 years

Reference(s):

1. UFSAR Section 7.3, Engineered Safety Feature Systems
2. UFSAR Section 9.2.10.2, Control Structure Chilled Water System
3. Design Baseline Document L-S-08B, Control Room HVAC System
4. Design Baseline Document L-S-08C, Reactor Enclosure HVAC System
5. Design Baseline Document L-S-29, Chilled Water System

System (No): Control Structure Chilled Water System (CSCWS) (90)

Component Description: Control Structure Water Chiller Storage Tank Relief Valves

ID Nos.: PSV-90-050A, PSV-90-050B, PSV-90-051A, PSV-90-051B

P&ID/COORD (respectively): M-90 (SHT. 1) / C-8, C-5, C-8, C-5

Code Class: NC **Category:** N/A **Active/Passive:** N/A

Size: 1.00 **Valve Type:** RL **Act. Type:** SA

Positions: Normal_C__ Safety_N/A__ Failsafe_N/A__

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These relief valves provide overpressure protection for storage tanks on the Control Structure Water Chiller skids which are used as holding tanks for freon from the chillers when shut down for maintenance. These storage tanks do not perform any function when the chillers are in operation and are not required to place or maintain the Reactor in a safe shutdown condition or mitigate the consequences of an accident.

Test Requirement(s):

No testing requirements

Reference(s):

1. UFSAR Section 9.2.10.2, Control Structure Chilled Water System
2. Design Baseline Document L-S-08B, Control Room HVAC System

System (No): Control Structure Chilled Water System (CSCWS) (90)

Component Description: Chilled Water Supply Valves to SGTS Room and Access Unit Coolers

ID Nos.: SV-90-045A, SV-90-045B, SV-90-047A, SV-90-047B

P&ID/COORD (respectively): M-90 (SHT 2) / G-3, G-2, E-3, E-2

Code Class: NC **Category:** B **Active/Passive:** A

Size: 1.50 (045)
1.00 (047) **Valve Type:** GL **Act. Type:** SO

Positions: Normal OC Safety OC Failsafe C

Test Frequency (Direction): ET-Q, FS-Q(C), ST-Q(O&C) **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): The SGTS Access and Room Unit Cooler chilled water inlet isolation valves perform an active safety function in the open and closed positions.

These valves must be capable of automatically opening when the associated unit cooler fan starts to provide chilled water flow through the cooler. These unit coolers are required to function during post-accident conditions to support the operation of the SGTS.

These valves also perform an active safety function in the closed position. They must be capable of automatic closure when their associated unit cooler fan is removed from service as a result of a faulted condition or malfunction to the unit cooler in order to ensure flow is directed to the redundant unit cooler.

The stems of these valves are visually inaccessible due to the solenoid actuators and they are not equipped with remote position indicating lights. Stroke time testing and verification of obturator position are confirmed by the use of non-intrusive acoustic monitoring equipment and the presence or absence of pressurized flow downstream of the SOV's.

The valve operators are powered from the Class 1E emergency ac power source to ensure operability in the event of a loss of offsite power.

Test Requirement(s):

Quarterly exercise test to the open and closed positions
Quarterly fail-safe test to the closed position
Quarterly stroke time test to the open and closed positions.

Reference(s):

1. UFSAR Section 7.3, Engineered Safety Feature Systems
2. UFSAR Section 9.2.10.2, Control Structure Chilled Water System
3. Design Baseline Document L-S-08B, Control Room HVAC System
4. Design Baseline Document L-S-08C, Reactor Enclosure HVAC System
5. Design Baseline Document L-S-29, Chilled Water System
6. A/R Number A0879020

System (No): Control Structure Chilled Water System (CSCWS) (90)

Component Description: Temperature Control Valves

ID Nos.: TV-C-90-042A, TV-C-90-042B, TV-C-90-043A, TV-C-90-043B, TV-C-90-044A, TV-C-90-044B

P&ID/COORD (respectively): M-90 (SHT 2) / D-4, G-4, D-6, G-6, D-7, G-7

Code Class: NC **Category:** N/A **Active/Passive:** N/A

Size: 3.00 **Valve Type:** 3-Way **Act. Type:** MO

Positions: Normal OC Safety TH Failsafe AI

Test Frequency (Direction): N/A **Appendix J, Type C:** N

VRR/VCS/ROJ: N/A

Remarks:

Safety Function(s): These temperature control valves regulate chilled water flow through the Control Room HVAC, the Emergency Switchgear and Battery Room HVAC and the Auxiliary Equipment Room HVAC cooling coils. They perform an active safety function in the throttled position to provide sufficient cooling water flow to satisfy the heat removal requirements of each unit cooler or cooling coil. However, the control circuitry for these valves is not provided with remote manual switches and the valves fail in the "as-is" position. Therefore, they are exempt from Code testing requirements on the basis that their safety function is to perform only a control function without a failsafe feature. This position is consistent with the guidance provided in NUREG-1482, Section 4.2.9.

Test Requirement(s):

No testing requirements

Reference(s):

1. UFSAR Section 7.3, Engineered Safety Feature Systems
2. UFSAR Section 9.2.10.2, Control Structure Chilled Water System
3. Design Baseline Document L-S-08B, Control Room HVAC System
4. Design Baseline Document L-S-08C, Reactor Enclosure HVAC System
5. Design Baseline Document L-S-29, Chilled Water System
6. NUREG-1482, Guidelines for Inservice Testing at Nuclear Power Plants, Section 4.2.9.