Table 3.3.2-1 (page 1 of 5)
Engineered Safety Feature Actuation System Instrumentation

FUNCTION	APPLICABLE MODES OR OTHER SPECIFIED CONDITIONS	REQUIRED CHANNELS	CONDITIONS	SURVEILLANCE REQUIREMENTS	ALLOWABLE VALUE	NOMINAL TRIP SETPOINT
1. Safety Injection[b]						
a. Manual Initiation	1,2,3,4	2	B	SR 3.3.2.8	NA	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
c. Containment Pressure - High	1,2,3	3	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 1.4 psig	1.2 psig
d. Pressurizer Pressure - Low	1,2,3[a]	4	D	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≥ 1839 psig	1845 psig
2. Containment Spray						
a. Manual Initiation	1,2,3,4	1 per train, 2 trains	B	SR 3.3.2.8	NA	NA
b. Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
c. Containment Pressure - High High	1,2,3	4	E	SR 3.3.2.1 SR 3.3.2.5 SR 3.3.2.9 SR 3.3.2.10	≤ 3.2 psig	3.0 psig
3. Containment Isolation[b]						
a. Phase A Isolation						
(1) Manual Initiation	1,2,3,4	2	B	SR 3.3.2.8	NA	NA
(2) Automatic Actuation Logic and Actuation Relays	1,2,3,4	2 trains	C	SR 3.3.2.2 SR 3.3.2.4 SR 3.3.2.6	NA	NA
(3) Safety Injection	Refer to Function 1 (Safety Injection) for all initiation functions and requirements.					

(continued)

(a) Above the P-11 (Pressurizer Pressure) interlock.

(b) The requirements of this Function are not applicable to Containment Purge Ventilation System and Hydrogen Purge System components, since the system containment isolation valves are sealed closed in MODES 1, 2, 3, and 4.

3.3 INSTRUMENTATION

3.3.6 Containment Air Release and Addition Isolation Instrumentation

LCO 3.3.6 The Containment Air Release and Addition Isolation instrumentation for each Function in Table 3.3.6-1 shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4

ACTIONS

-----NOTE-----
Separate Condition entry is allowed for each Function.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One or more Functions with one or more manual or automatic actuation trains inoperable.	A.1 Enter applicable Conditions and Required Actions of LCO 3.6.3, "Containment Isolation Valves," for containment air release and addition isolation valves made inoperable by isolation instrumentation.	Immediately

SURVEILLANCE REQUIREMENTS

---NOTE---
Refer to Table 3.3.6-1 to determine which SRs apply for each Containment Air Release and Addition Isolation Function.

SURVEILLANCE		FREQUENCY
SR 3.3.6.1	Perform ACTUATION LOGIC TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.6.2	Perform MASTER RELAY TEST.	31 days on a STAGGERED TEST BASIS
SR 3.3.6.3	Perform SLAVE RELAY TEST.	92 days
SR 3.3.6.4	---NOTE--- Verification of setpoint is not required. --- Perform TADOT.	18 months

Table 3.3.6-1 (page 1 of 1)
Containment Air Release and Addition Isolation Instrumentation

	FUNCTION	REQUIRED TRAINS	SURVEILLANCE REQUIREMENTS	NOMINAL TRIP SETPOINT
1.	Manual Initiation	2	SR 3.3.6.4	NA
2.	Automatic Actuation Logic and Actuation Relays	2	SR 3.3.6.1 SR 3.3.6.2 SR 3.3.6.3	NA
3.	Safety Injection	Refer to LCO 3.3.2, "ESFAS Instrumentation," Table 3.3.2-1, Function 1, for all initiation functions and requirements.		

B 3.3 INSTRUMENTATION

B 3.3.6 Containment Air Release and Addition Isolation Instrumentation

BASES

BACKGROUND

Containment air release and addition isolation instrumentation closes the containment isolation valves in the Containment Air Release and Addition System. This action isolates the containment atmosphere from the environment to minimize releases of radioactivity in the event of an accident.

Containment air release and addition isolation initiates on an automatic safety injection (SI) signal through the Containment Isolation—Phase A Function, or by manual actuation of Phase A Isolation. The Bases for LCO 3.3.2, "Engineered Safety Feature Actuation System (ESFAS) Instrumentation," discuss these modes of initiation.

Each of the containment air release and addition penetrations has inner and outer containment isolation valves. A safety injection initiates containment isolation, which closes both inner and outer containment isolation valves. The Containment Air Release and Addition System is described in the Bases for LCO 3.6.3, "Containment Isolation Valves."

APPLICABLE SAFETY ANALYSES

The safety analyses assume that the containment remains intact with penetrations unnecessary for core cooling isolated early in the event, within approximately 60 seconds. The Containment Air Release and Addition System isolation valves may be used in MODES 1-4 and their rapid isolation is assumed. Containment isolation ensures meeting the containment leakage rate assumptions of the safety analyses, and ensures that the calculated accidental offsite radiological doses are below 10 CFR 100 (Ref. 1) limits.

The containment air release and addition isolation instrumentation satisfies Criterion 3 of 10 CFR 50.36 (Ref. 2).

LCO

The LCO requirements ensure that the instrumentation necessary to initiate Containment Air Release and Addition Isolation, listed in Table 3.3.6-1, is OPERABLE.

1. Manual Initiation

The LCO requires two trains OPERABLE. The operator can initiate containment isolation at any time by using either of two switches (manual Phase A actuation or manual spray actuation) in the control room. Either switch actuates its associated train. This action will cause actuation of all components in the same manner as any of the automatic actuation signals.

The LCO for Manual Initiation ensures the proper amount of redundancy is maintained in the manual actuation circuitry to ensure the operator has manual initiation capability.

Each train consists of one push button and the interconnecting wiring to the actuation logic cabinet.

2. Automatic Actuation Logic and Actuation Relays

The LCO requires two trains of Automatic Actuation Logic and Actuation Relays OPERABLE to ensure that no single random failure can prevent automatic actuation.

Automatic Actuation Logic and Actuation Relays consist of the same features and operate in the same manner as described for ESFAS Function 1.b, SI, and ESFAS Function 3.a, Containment Phase A Isolation. The applicable MODES and specified conditions for the containment air release and addition isolation portion of these Functions are different and less restrictive than those for their Phase A isolation and SI roles. If one or more of the SI or Phase A isolation Functions becomes inoperable in such a manner that only the containment air release and addition isolation Function is affected, the Conditions applicable to their SI and Phase A isolation Functions need not be entered. The less restrictive Actions specified for inoperability of the containment air release and addition isolation Functions specify sufficient compensatory measures for this case.

LCO (continued)

3. Safety Injection

Refer to LCO 3.3.2, Function 1, for all initiating Functions and requirements.

APPLICABILITY

The Manual Initiation, Automatic Actuation Logic and Actuation Relays, and Safety Injection Functions are required OPERABLE in MODES 1, 2, 3, and 4. Under these conditions, the potential exists for an accident that could release fission product radioactivity into containment. Therefore, the containment air release and addition isolation instrumentation must be OPERABLE in these MODES.

For other MODES and conditions, LCO 3.9.3, "Containment Penetrations", provides appropriate requirements, since the potential for radioactive releases is minimized and operator action is sufficient to ensure post accident offsite doses are maintained within the limits of Reference 1.

ACTIONS

A Note has been added to the ACTIONS to clarify the application of Completion Time rules. The Conditions of this Specification may be entered independently for each Function listed in Table 3.3.6-1. The Completion Time(s) of the inoperable train(s) of a Function will be tracked separately for each Function starting from the time the Condition was entered for that Function.

A.1

Condition A applies to all containment air release and addition isolation Functions and addresses the train orientation of the Solid State Protection System (SSPS) and the master and slave relays for these Functions.

If a train is inoperable, operation may continue as long as the Required Action for the applicable Conditions of LCO 3.6.3 is met for each valve made inoperable by failure of isolation instrumentation.

SURVEILLANCE REQUIREMENTS

A Note has been added to the SR Table to clarify that Table 3.3.6-1 determines which SRs apply to which containment air release and addition isolation Functions.

SR 3.3.6.1

SR 3.3.6.1 is the performance of an ACTUATION LOGIC TEST. The train being tested is placed in the bypass condition, thus preventing inadvertent actuation. Through the semiautomatic tester, all possible logic combinations, with and without applicable permissives, are tested for each protection function. In addition, the master relay coil is pulse tested for continuity. This verifies that the logic modules are OPERABLE and there is an intact voltage signal path to the master relay coils. This test is performed every 31 days on a STAGGERED TEST BASIS. The Surveillance Interval is acceptable based on instrument reliability and industry operating experience.

SR 3.3.6.2

SR 3.3.6.2 is the performance of a MASTER RELAY TEST. The MASTER RELAY TEST is the energizing of the master relay, verifying contact operation and a low voltage continuity check of the slave relay coil. Upon master relay contact operation, a low voltage is injected to the slave relay coil. This voltage is insufficient to pick up the slave relay, but large enough to demonstrate signal path continuity. This test is performed every 31 days on a STAGGERED TEST BASIS. The Surveillance interval is acceptable based on instrument reliability and industry operating experience.

SR 3.3.6.3

SR 3.3.6.3 is the performance of a SLAVE RELAY TEST. The SLAVE RELAY TEST is the energizing of the slave relays. Contact operation is verified in one of two ways. Actuation equipment that may be operated in the design mitigation mode is either allowed to function or is placed in a condition where the relay contact operation can be verified without operation of the equipment. Actuation equipment that may not be operated in the design mitigation mode is prevented from operation by the SLAVE RELAY TEST circuit. For this latter case, contact operation is verified by a continuity check of the circuit containing the slave relay. This test is performed every 92 days. The Frequency is acceptable based on instrument reliability and industry operating experience.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.3.6.4

SR 3.3.6.4 is the performance of a TADOT. This test is a check of the Manual Actuation Functions and is performed every 18 months. Each Manual Actuation Function is tested up to, and including, the master relay coils. In some instances, the test includes actuation of the end device (i.e., pump starts, valve cycles, etc.).

The test also includes trip devices that provide actuation signals directly to the SSPS, bypassing the analog process control equipment. The SR is modified by a Note that excludes verification of setpoints during the TADOT. The Functions tested have no setpoints associated with them.

The Frequency is based on the known reliability of the Function and the redundancy available, and has been shown to be acceptable through operating experience.

REFERENCES

1. 10 CFR 100.11.

2. 10 CFR 50.36, Technical Specifications, (c)(2)(ii).

B 3.6 CONTAINMENT SYSTEMS

B 3.6.3 Containment Isolation Valves

BASES

BACKGROUND

The containment isolation valves form part of the containment pressure boundary and provide a means for fluid penetrations not serving accident consequence limiting systems to be provided with two isolation barriers that are closed on a containment isolation signal. These isolation devices are either passive or active (automatic). Manual valves, de-activated automatic valves secured in their closed position (including check valves with flow through the valve secured), blind flanges, and closed systems are considered passive devices. Check valves, or other automatic valves designed to close without operator action following an accident, are considered active devices. Two barriers in series are provided for each penetration so that no single credible failure or malfunction of an active component can result in a loss of isolation or leakage that exceeds limits assumed in the safety analyses. One of these barriers may be a closed system. These barriers (typically containment isolation valves) make up the Containment Isolation System.

Automatic isolation signals are produced during accident conditions. Containment Phase "A" isolation occurs upon receipt of a safety injection signal. The Phase "A" isolation signal isolates nonessential process lines in order to minimize leakage of fission product radioactivity. Containment Phase "B" isolation occurs upon receipt of a containment pressure High-High signal and isolates the remaining process lines, except systems required for accident mitigation. The Containment Purge Ventilation and Containment Air Release and Addition valves also receive an isolation signal on a containment high radiation condition. As a result, the containment isolation valves (and blind flanges) help ensure that the containment atmosphere will be isolated from the environment in the event of a release of fission product radioactivity to the containment atmosphere as a result of a Design Basis Accident (DBA).

The OPERABILITY requirements for containment isolation valves help ensure that containment is isolated within the Time limits assumed in the safety analyses. Therefore, the OPERABILITY requirements provide assurance that the containment function assumed in the safety analyses will be maintained.

BASES

BACKGROUND (continued)

Containment Purge Ventilation System

The Containment Purge Ventilation System consists of the Containment Purge Supply and Exhaust Systems and the Incore Instrumentation Room Purge Supply and Exhaust Systems. These systems are used during refueling and post LOCA conditions and are not utilized during MODES 1 - 4. The penetration valves are sealed closed in MODES 1 – 4.

The Containment Purge Supply System includes one supply duct penetration through the Reactor Building wall into the annulus area. There are four purge air supply penetrations through the containment vessel, two to the upper compartment and two to the lower compartment. Two normally closed isolation valves at each penetration through the containment vessel provide containment isolation.

The Containment Purge Exhaust System includes one purge exhaust duct penetration through the Reactor Building wall from the annulus area. There are three purge exhaust penetrations through the containment vessel, two from the upper compartment and one from the lower compartment. Two normally closed isolation valves at each penetration through the containment vessel provide containment isolation.

The Incore Instrumentation Room Purge Supply System consists of one purge supply penetration through the Reactor Building wall and one through the containment vessel. Two normally closed isolation valves at the containment penetration provide containment isolation.

The Incore Instrumentation Room Purge Exhaust System consists of one purge exhaust penetration through the Reactor Building wall and one through the containment vessel. Two normally closed isolation valves at the penetration through the containment vessel provide containment isolation.

Containment Hydrogen Purge System

The Containment Hydrogen Purge System consists of a containment hydrogen purge inlet blower, which blows air from the Auxiliary Building through a 4 inch pipe into the upper compartment of the containment. Another 4 inch pipe originating in the upper compartment of the containment purges air from the containment to the annulus. The penetration valves are sealed closed during MODES 1 - 4.

BASES

BACKGROUND (continued)

Containment Air Release and Addition System

The Containment Air Release and Addition System is only used for controlling Containment pressure during normal unit operation. Isolation valves are located both inside and outside of the Containment on each containment penetration.

APPLICABLE SAFETY ANALYSES

The containment isolation valve LCO was derived from the assumptions related to minimizing the loss of reactor coolant inventory and establishing the containment boundary during major accidents. As part of the containment boundary, containment isolation valve OPERABILITY supports leak tightness of the containment. Therefore, the safety analyses of any event requiring isolation of containment is applicable to this LCO.

The DBAs that result in a release of radioactive material within containment are a loss of coolant accident (LOCA) and a rod ejection accident (Ref. 1). In the analyses for each of these accidents, it is assumed that containment isolation valves are either closed or function to close within the required isolation time following event initiation. This ensures that potential paths to the environment through containment isolation valves (including containment purge valves) are minimized. The safety analyses assume that the containment purge supply and/or exhaust isolation valves for the lower compartment and the upper compartment, instrument room, and the Hydrogen Purge System are closed at event initiation. Since the Containment Purge Ventilation System and the Hydrogen Purge System isolation valves are sealed closed in MODES 1 – 4, they are not analyzed mechanistically in the dose calculations.

The DBA analysis assumes that, within ≤ 76 seconds after the accident, isolation of the containment is complete and leakage terminated except for the design leakage rate, L_a. The containment isolation total response time of ≤ 76 seconds includes signal delay, diesel generator startup (for loss of offsite power), and containment isolation valve stroke times.

The single failure criterion required to be imposed in the conduct of plant safety analyses was considered in the original design of the containment purge valves. Two valves in series on each purge line provide assurance that both the supply and exhaust lines could be isolated even if a single failure occurred.

BASES

APPLICABLE SAFETY ANALYSES (continued)

The containment purge and hydrogen purge valves may be unable to close in the environment following a LOCA. Therefore, each of the containment purge and hydrogen purge valves is required to remain sealed closed during MODES 1, 2, 3, and 4. The containment air release and addition valves may be opened during normal operation. In this case, the single failure criterion remains applicable to the containment air release and addition valves due to failure in the control circuit associated with each valve. The system valve design precludes a single failure from compromising the containment boundary as long as the system is operated in accordance with the subject LCO.

The containment isolation valves satisfy Criterion 3 of 10 CFR 50.36 (Ref. 2).

LCO

Containment isolation valves form a part of the containment boundary. The containment isolation valves' safety function is related to minimizing the loss of reactor coolant inventory and establishing the containment boundary during a DBA.

The automatic power operated isolation valves are required to have isolation times within limits and to actuate on an automatic isolation signal. The containment purge supply and exhaust isolation valves for the lower compartment, upper compartment, instrument room, and the Hydrogen Purge System must be maintained sealed closed. The valves covered by this LCO are listed along with their associated stroke times in the UFSAR (Ref. 3).

The normally closed isolation valves are considered OPERABLE when manual valves are closed, automatic valves are de-activated and secured in their closed position, blind flanges are in place, and closed systems are intact. These passive isolation valves/devices are those listed in Reference 3.

Valves with resilient seals and reactor building bypass valves must meet additional leakage rate requirements. The other containment isolation valve leakage rates are addressed by LCO 3.6.1, "Containment," as Type C testing.

This LCO provides assurance that the containment isolation valves and purge valves will perform their designed safety functions to minimize the loss of reactor coolant inventory and establish the containment boundary during accidents.