

3.6 CONTAINMENT SYSTEMS

3.6.4.3 Standby Gas Treatment (SGT) System

LCO 3.6.4.3 ~~Two~~ ^{divisions} SGT ~~subsystems~~ shall be OPERABLE.

APPLICABILITY: MODES 1, 2, and 3,
During movement of irradiated fuel assemblies in the
~~secondary~~ containment,
During CORE ALTERATIONS,
During operations with a potential for draining the reactor vessel (OPDRVs).

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One SGT subsystem ^{division} inoperable.	A.1 Restore SGT subsystem ^{division} to OPERABLE status.	7 days
B. ^C Required Action and associated Completion Time of Condition A or B not met in MODE 1, 2, or 3.	^C B.1 Be in MODE 3.	12 hours
	^C AND B.2 Be in MODE 4.	36 hours
D. Required Action and associated Completion Time of Condition A not met during movement of irradiated fuel assemblies in the secondary containment, during CORE ALTERATIONS, or during OPDRVs.	-----NOTE----- LCO 3.0.3 is not applicable. ^D G.1 Place OPERABLE SGT subsystem ^{division} in operation. OR ^{divisions}	Immediately (continued)

B. Two SGT ~~subsystems~~ inoperable in MODES 1, 2, or 3.

B.1 Restore one SGT ~~subsystem~~ ^{division} to OPERABLE status.
4 hours

ABWR/4 STS

3.6-53

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ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
<p>^D t. (continued)</p>	<p>^D t.2.1 Suspend movement of irradiated fuel assemblies in [secondary] containment.</p> <p><u>AND</u></p> <p>^D t.2.2 Suspend CORE ALTERATIONS.</p> <p><u>AND</u></p> <p>^D t.2.3 Initiate action to suspend OPDRVs.</p>	<p>Immediately</p> <p>Immediately</p> <p>Immediately</p>
<p>^E D. Two SGT subsystems ^{divisions} inoperable during movement of irradiated fuel assemblies in the [secondary] containment, during CORE ALTERATIONS, or during OPDRV.</p>	<p>^E D.1 -----NOTE----- LCO 3.0.3 is not applicable. -----</p> <p>Suspend movement of irradiated fuel assemblies in [secondary] containment.</p> <p><u>AND</u></p> <p>^E D.2 Suspend CORE ALTERATIONS.</p> <p><u>AND</u></p> <p>^E D.3 Initiate action to suspend OPDRVs.</p>	<p>Immediately</p> <p>Immediately</p> <p>Immediately</p>

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.6.4.3.1 Operate each SGT subsystem ^{division} for $\geq [10]$ continuous hours [with heaters operating].	31 days
SR 3.6.4.3.2 Perform required SGT filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP
SR 3.6.4.3.3 Verify each SGT subsystem ^{division} actuates on an actual or simulated initiation signal.	[18] months
[SR 3.6.4.3.4 Verify each SGT filter cooler bypass damper can be opened and the fan started.]	[18] months]

change "18 months"
to "REFUELING
INTERVAL"

B 3.6 CONTAINMENT SYSTEMS

B 3.6.4.3 Standby Gas Treatment (SGT) System

BASES

BACKGROUND

The SGT System is required by 10 CFR 50, Appendix A, GDC 41, "Containment Atmosphere Cleanup" (Ref. 1). The function of the SGT System is to ensure that radioactive materials that leak from the primary containment into the [secondary] containment following a Design Basis Accident (DBA) are filtered and adsorbed prior to exhausting to the environment.

The SGT System consists of ^{the following principal} ~~two fully redundant subsystems, each with its own set of ductwork, dampers, charcoal filter train, and controls.~~ components: 11

INSERT
U →

Each charcoal filter train consists of (components listed in order of the direction of the air flow):

- a. A demister or moisture separator;
- b. An electric heater;
- c. A prefilter;
- d. A high efficiency particulate air (HEPA) filter;
- e. A charcoal adsorber;
- f. A second HEPA filter; and
- g. A centrifugal fan.

The sizing of the SGT System equipment and components is based on the results of an infiltration analysis, as well as an exfiltration analysis of the [secondary] containment. The internal pressure of the SGT System boundary region is maintained at a negative pressure of (0.25) inches water gauge when the system is in operation, which represents the internal pressure required to ensure zero exfiltration of air from the building when exposed to a (10) mph wind blowing at an angle of [45]° to the building. 20
8.9 m/s

The ~~demister~~ is provided to remove entrained water in the air, while the electric heater reduces the relative humidity

moisture
separator

(continued)

(u)

- A. One, 100 percent capacity charcoal filter train, consisting of (components listed in order of air flow direction):
1. Prefilter
 2. High efficiency particulate air (HEPA) filter
 3. Charcoal adsorber
 4. HEPA filter
- B. Two fully redundant subsystems, each with its own ductwork, dampers, and controls, and consisting of:
1. Demister
 2. Electric heater
 3. Centrifugal fan with inlet flow control vanes.

- (1) Two filter ~~trains~~ ^{divisions} each consisting of a moisture separator, an electric process heater, a prefilter, a high efficiency particulate air (HEPA) filter, a charcoal absorber, a second HEPA filter, and space heaters.
- (2) Two independent process fans ^{division} located downstream of each filter ~~train~~ and two independent cooling fans for the removal of decay heat from charcoal.

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BASES

BACKGROUND
(continued)

of the airstream to less than [70]²% (Ref. 2). The prefilter removes large particulate matter, while the HEPA filter removes fine particulate matter and protects the charcoal from fouling. The charcoal adsorber removes gaseous elemental iodine and organic iodides, and the final HEPA filter collects any carbon fines exhausted from the charcoal adsorber.

SGT'S

division
~~subsystem~~

The SGT System automatically starts and operates in response to actuation signals indicative of conditions or an accident that could require operation of the system. Following initiation, both ~~charcoal filter train fans~~ start. Upon verification that both ~~subsystems~~ are operating, the redundant ~~subsystem~~ is normally shut down.

one of
~~divisions~~ ~~divisions~~

APPLICABLE
SAFETY ANALYSES

The design basis for the SGT System is to mitigate the consequences of a loss of coolant accident and fuel handling accidents (Ref. 2). For all events analyzed, the SGT System is shown to be automatically initiated to reduce, via filtration and adsorption, the radioactive material released to the environment.

The SGT System satisfies Criterion 3 of the NRC Policy Statement.

division

LCO

Following a DBA, a minimum of one SGT ~~subsystem~~ is required to maintain the [secondary] containment at a negative pressure with respect to the environment and to process gaseous releases. Meeting the LCO requirements for two OPERABLE ~~subsystems~~ ensures operation of at least one SGT ~~subsystem~~ in the event of a single active failure.

division ~~divisions~~ ~~divisions~~

APPLICABILITY

In MODES 1, 2, and 3, a DBA could lead to a fission product release to primary containment that leaks to secondary containment. Therefore, SGT System OPERABILITY is required during these MODES.

In MODES 4 and 5, the probability and consequences of these events are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining the SGT

(continued)

BASES

APPLICABILITY
(continued)

System in OPERABLE status is not required in MODE 4 or 5, except for other situations under which significant releases of radioactive material can be postulated, such as during operations with a potential for draining the reactor vessel (OPDRVs), during CORE ALTERATIONS, or during movement of irradiated fuel assemblies in the [secondary] containment.

ACTIONS

A.1

division

active

division

division

With one SGT subsystem inoperable, the inoperable subsystem must be restored to OPERABLE status in 7 days. In this Condition, the remaining OPERABLE SGT subsystem is adequate to perform the required radioactivity release control function. However, the overall system reliability is reduced because a single failure in the OPERABLE subsystem could result in the radioactivity release control function not being adequately performed. The 7 day Completion Time is based on consideration of such factors as the availability of the OPERABLE redundant SGT system and the low probability of a DEA occurring during this period.

divisions

B.1

If both SGT ~~systems~~ are inoperable in MODE 1, 2, or 3, the SGT System may not be capable of supporting the required radioactivity release control function. Therefore actions are required consistent with that required for an inoperable secondary containment.

B.1 and B.2

divisions
(PLANTS)

If the SGT subsystem cannot be restored to OPERABLE status within the required Completion Time in MODE 1, 2, or 3, the plant must be brought to a MODE in which the LCO does not apply. To achieve this status, the plant must be brought to at least MODE 3 within 12 hours and to MODE 4 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required plant conditions from full power conditions in an orderly manner and without challenging plant systems.

D.1, D.2.1, D.2.2, and D.2.3

During movement of irradiated fuel assemblies, in the [secondary] containment, during CORE ALTERATIONS, or during OPDRVs, when Required Action A.1 cannot be completed within the required Completion Time, the OPERABLE SGT subsystem should immediately be placed in operation. This action ensures that the remaining subsystem is OPERABLE, that no failures that could prevent automatic actuation have

division

(continued)

BASES

ACTIONS

^D ^D ^D ^D
L.1, L.2.1, L.2.2, and L.2.3 (continued)

occurred, and that any other failure would be readily detected.

^D
An alternative to Required Action L.1 is to immediately suspend activities that represent a potential for releasing radioactive material to the [secondary] containment, thus placing the plant in a condition that minimizes risk. If applicable, CORE ALTERATIONS and movement of irradiated fuel assemblies must immediately be suspended. Suspension of these activities must not preclude completion of movement of a component to a safe position. Also, if applicable, actions must immediately be initiated to suspend OPDRVs in order to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until OPDRVs are suspended.

^D
The Required Actions of Condition L have been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor operations. Therefore, in either case, inability to suspend movement of irradiated fuel assemblies would not be a sufficient reason to require a reactor shutdown.

^E ^E ^E
E.1, E.2, and E.3 ^{Divisions}
_{both} ^{traces}

When ~~the~~ SGT subsystems are inoperable, if applicable, CORE ALTERATIONS and movement of irradiated fuel assemblies in [secondary] containment must immediately be suspended. Suspension of these activities shall not preclude completion of movement of a component to a safe position. Also, if applicable, actions must immediately be initiated to suspend OPDRVs in order to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until OPDRVs are suspended.

^E
Required Action E.1 has been modified by a Note stating that LCO 3.0.3 is not applicable. If moving irradiated fuel assemblies while in MODE 4 or 5, LCO 3.0.3 would not specify any action. If moving irradiated fuel assemblies while in MODE 1, 2, or 3, the fuel movement is independent of reactor

(continued)

BASES

ACTIONS

^E0.1, ^E0.2, and ^E0.3 (continued)

operations. Therefore, in either case, inability to suspend movement of irradiated fuel assemblies would not be a sufficient reason to require a reactor shutdown.

SURVEILLANCE REQUIREMENTS

SR 3.6.4.3.1

Operating each SGT ~~subsystem~~ ^{division} for $\geq [10]^0$ continuous hours ensures that ~~both subsystems~~ ^{both divisions} are OPERABLE and that all associated controls are functioning properly. It also ensures that blockage, fan or motor failure, or excessive vibration can be detected for corrective action. Operation ~~with the heaters on (automatic heater cycling to maintain temperature)]~~ ^{with the heaters on (automatic heater cycling to maintain temperature)]} for $\geq [10]^0$ continuous hours every 31 days eliminates moisture on the adsorbers and HEPA filters. The 31 day Frequency was developed in consideration of the known reliability of fan motors and controls and the redundancy available in the system.

SR 3.6.4.3.2

This SR verifies that the required SGT filter testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The SGT System filter tests are in accordance with Regulatory Guide 1.52 (Ref. 3). The VFTP includes testing HEPA filter performance, charcoal adsorber efficiency, ~~minimum~~ system flow rate, and the physical properties of the activated charcoal (general use and following specific operations). Specific test frequencies and additional information are discussed in detail in the VFTP.

SR 3.6.4.3.3

This SR verifies that each SGT ~~subsystem~~ ^{division} starts on receipt of an actual or simulated initiation signal. While this Surveillance can be performed with the reactor at power, operating experience has shown that these components usually pass the Surveillance when performed at the ~~[18]^0~~ ^{[18]^0} month Frequency. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.2.6 overlaps this SR to provide complete testing of the safety

REFUELING INTERVAL

(continued)

BASES

SURVEILLANCE
REQUIREMENTS

SR 3.6.4.3.3 (continued)

function. Therefore, the Frequency was found to be acceptable from a reliability standpoint.

SR 3.6.4.3.4

This SR verifies that the filter cooler bypass damper can be opened and the fan started. This ensures that the ventilation mode of SGT System operation is available. While this Surveillance can be performed with the reactor at power, operating experience has shown that these components usually pass the Surveillance when performed at the [18] month Frequency, which is based on the refueling cycle. Therefore, the Frequency was found to be acceptable from a reliability standpoint.

REFUELING
INTERVAL

REFERENCES

1. 10 CFR 50, Appendix A, GDC 41.
 2. ^SAGWR FSAR, Section [6.2.3].
 3. Regulatory Guide 1.52, Rev. [2].
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