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TSB1 - TECHNICAL SPECIFICATION BASES UNIT 1 MANUAL

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CATEGORY: DOCUMENTS TYPE: TSB1

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# SSES MANUAL

Manual Name: TSB1

Manual Title: TECHNICAL SPECIFICATION BASES UNIT 1 MANUAL

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**Manual Title:** TECHNICAL SPECIFICATION BASES UNIT 1 MANUAL

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*(continued)*

1. *Phragmites* (common)

Figure 1 consists of two scatter plots. The left plot shows a positive correlation between the number of children (x-axis) and the number of mothers (y-axis). The right plot shows a negative correlation between the number of children (x-axis) and the number of mothers (y-axis).

Condition	Control (%)	MCI (%)	AD (%)
A	~95	~85	~75
B	~90	~80	~70
C	~85	~75	~65
D	~80	~75	~70

100

100

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10/6/05

## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.4.1 Secondary Containment

#### **BASES**

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**BACKGROUND** The secondary containment structure completely encloses the primary containment structure such that a dual-containment design is utilized to limit the spread of radioactivity to the environment to within limits. The function of the secondary containment is to contain, dilute, and hold up fission products that may leak from primary containment into secondary containment following a Design Basis Accident (DBA). In conjunction with operation of the Standby Gas Treatment (SGT) System and closure of certain valves whose lines penetrate the secondary containment, the secondary containment is designed to reduce the activity level of the fission products prior to release to the environment and to isolate and contain fission products that are released during certain operations that take place inside primary containment, when primary containment is not required to be OPERABLE, or that take place outside primary containment (Ref. 1).

The secondary containment is a structure that completely encloses the primary containment and reactor coolant pressure boundary components. This structure forms a control volume that serves to hold up and dilute the fission products. It is possible for the pressure in the control volume to rise relative to the environmental pressure (e.g., due to pump and motor heat load additions).

The secondary containment boundary consists of the reactor building structure and associated removable walls and panels, hatches, doors, dampers, sealed penetrations and valves. The secondary containment is divided into Zone I, Zone II and Zone III, each of which must be OPERABLE depending on plant status and the alignment of the secondary containment boundary. Specifically, the Unit 1 secondary containment boundary can be modified to exclude Zone II. Similarly, the Unit 2 secondary containment boundary can be modified to exclude Zone I. Secondary containment may consist of only Zone III when in MODE 4 or 5 during CORE ALTERATIONS, or during handling of irradiated fuel within the Zone III secondary containment boundary.

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(continued)

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## BASES

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### BACKGROUND (continued)

To prevent ground level exfiltration while allowing the secondary containment to be designed as a conventional structure, the secondary containment requires support systems to maintain the control volume pressure at less than the external pressure. Requirements for the safety related systems are specified separately in LCO 3.6.4.2, "Secondary Containment Isolation Valves (SCIVs)," and LCO 3.6.4.3, "Standby Gas Treatment (SGT) System." When one or more zones are excluded from secondary containment, the specific requirements for support systems will also change (e.g., required secondary containment isolation valves).

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### APPLICABLE SAFETY ANALYSES

There are two principal accidents for which credit is taken for secondary containment OPERABILITY. These are a loss of coolant accident (LOCA) (Ref. 2) and a fuel handling accident inside secondary containment (Ref. 3). The secondary containment performs no active function in response to either of these limiting events; however, its leak tightness is required to ensure that the release of radioactive materials from the primary containment is restricted to those leakage paths and associated leakage rates assumed in the accident analysis and that fission products entrapped within the secondary containment structure will be treated by the SGT System prior to discharge to the environment.

Secondary containment satisfies Criterion 3 of the NRC Policy Statement (Ref. 4).

---

### LCO

An OPERABLE secondary containment provides a control volume into which fission products that bypass or leak from primary containment, or are released from the reactor coolant pressure boundary components located in secondary containment, can be diluted and processed prior to release to the environment. For the secondary containment to be considered OPERABLE, it must have adequate leak tightness to ensure that the required vacuum can be established and maintained. The leak tightness of secondary containment must also ensure that the release of radioactive materials to the environment is restricted to those leakage paths and associated leakage rates assumed in the accident analysis. For example, secondary containment bypass leakage must be restricted to the leakage rate required by LCO 3.6.1.3. The secondary containment boundary required to be OPERABLE is dependent on the operating status of both units, as well as the configuration of walls, doors, hatches, SCIVs, and available flow paths to the SGT System.

(continued)

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BASES (continued)

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**APPLICABILITY** In MODES 1, 2, and 3, a LOCA could lead to a fission product release to primary containment that leaks to secondary containment. Therefore, secondary containment OPERABILITY is required during the same operating conditions that require primary containment OPERABILITY.

In MODES 4 and 5, the probability and consequences of the LOCA are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining secondary containment OPERABLE is not required in MODE 4 or 5 to ensure a control volume, except for other situations for 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.

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**ACTIONS**

A.1

If secondary containment is inoperable, it must be restored to OPERABLE status within 4 hours. The 4 hour Completion Time provides a period of time to correct the problem that is commensurate with the importance of maintaining secondary containment during MODES 1, 2, and 3. This time period also ensures that the probability of an accident (requiring secondary containment OPERABILITY) occurring during periods where secondary containment is inoperable is minimal.

A temporary (one-time) Completion Time is connected to the Completion Time Requirements above (4 hours) with an "OR" connector. The Temporary Completion Time is 48 hours and applies to the replacement of the Reactor Building Recirculating Fan Damper Motors. The Temporary Completion Time of 48 hours may only be used once, and expires on December 31, 2005.

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(continued)

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**BASES**

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**ACTIONS  
(continued)**

**B.1 and B.2**

If secondary containment cannot be restored to OPERABLE status within the required Completion Time, 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.

**C.1, C.2, and C.3**

Movement of irradiated fuel assemblies in the secondary containment, CORE ALTERATIONS, and OPDRVs can be postulated to cause fission product release to the secondary containment. In such cases, the secondary containment is the only barrier to release of fission products to the environment. CORE ALTERATIONS and movement of irradiated fuel assemblies must be immediately suspended if the secondary containment is inoperable.

Suspension of these activities shall not preclude completing an action that involves moving a component to a safe position. Also, action must be immediately initiated to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until OPDRVs are suspended.

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

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**SURVEILLANCE  
REQUIREMENTS**

**SR 3.6.4.1.1**

This SR ensures that the secondary containment boundary is sufficiently leak tight to preclude exfiltration.

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(continued)

## BASES

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### SURVEILLANCE REQUIREMENTS

#### SR 3.6.4.1.1 (continued)

The 24 hour Frequency of this SR was developed based on operating experience related to secondary containment vacuum variations during the applicable MODES and the low probability of a DBA occurring between surveillances.

Furthermore, the 24 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal secondary containment vacuum condition.

#### SR 3.6.4.1.2 and SR 3.6.4.1.3

Verifying that secondary containment equipment hatches, removable walls and one access door in each access opening required to be closed are closed ensures that the infiltration of outside air of such a magnitude as to prevent maintaining the desired negative pressure does not occur.

Verifying that all such openings are closed also provides adequate assurance that exfiltration from the secondary containment will not occur. In this application, the term "sealed" has no connotation of leak tightness.

An access opening typically contains one inner and one outer door. Maintaining secondary containment OPERABILITY requires verifying one door in each access opening to secondary containment zones is closed. In some cases (e.g., railroad bay), secondary containment access openings are shared such that a secondary containment barrier may have multiple inner or multiple outer doors. The intent is to maintain the secondary containment barrier intact, which is achieved by maintaining the inner or outer portion of the barrier closed at all times. However, all secondary containment access doors are normally kept closed, except when the access opening is being used for entry and exit or when maintenance is being performed on an access opening.

When the railroad bay door (No. 101) is closed; all Zone I and III hatches, removable walls, dampers, and one door in each access opening connected to the railroad access bay are closed; or, only Zone I removable walls and/or doors are open to the railroad access shaft; or, only Zone III hatches and/or dampers are open to the railroad access shaft. When the railroad bay door (No. 101) is open; all Zone I and III hatches, removable walls, dampers, and one door in each access opening connected to the railroad access bay are closed. The truck bay hatch is closed and the truck bay door (No. 102) is closed unless Zone II is isolated from Zones I and III.

(continued)

## **BASES**

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### **SURVEILLANCE REQUIREMENTS**     SR 3.6.4.1.2 and SR 3.6.4.1.3 (continued)

When an access opening between required secondary containment zones is being used for exit and entry, then at least one door (where two doors are provided) must remain closed. The access openings between secondary containment zones which are not provided with two doors are administratively controlled to maintain secondary containment integrity during exit and entry. This Surveillance is modified by a Note that allows access openings with a single door (i.e., no airlock) within the secondary containment boundary (i.e., between required secondary containment zones) to be opened for entry and exit. Opening of an access door for entry and exit allows sufficient administrative control by individual personnel making the entries and exits to assure the secondary containment function is not degraded. When one of the zones is not a zone required for secondary containment OPERABILITY, the Note allowance would not apply.

The 31 day Frequency for these SRs has been shown to be adequate, based on operating experience, and is considered adequate in view of the other indications of door and hatch status that are available to the operator.

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(continued)

## BASES

### SURVEILLANCE REQUIREMENTS (continued)

#### SR 3.6.4.1.4 and SR 3.6.4.1.5

The SGT System exhausts the secondary containment atmosphere to the environment through appropriate treatment equipment. To ensure that all fission products are treated, SR 3.6.4.1.4 verifies that the SGT System will rapidly establish and maintain a pressure in the secondary containment that is less than the pressure external to the secondary containment boundary. This is confirmed by demonstrating that one SGT subsystem will draw down the secondary containment to  $\geq 0.25$  inches of vacuum water gauge in less than or equal to the maximum time allowed. This cannot be accomplished if the secondary containment boundary is not intact. SR 3.6.4.1.5 demonstrates that one SGT subsystem can maintain  $\geq 0.25$  inches of vacuum water gauge for at least 1 hour at less than or equal to the maximum flow rate permitted for the secondary containment configuration that is operable. The 1 hour test period allows secondary containment to be in thermal equilibrium at steady state conditions. As noted, both SR 3.6.4.1.4 and SR 3.6.4.1.5 acceptance limits are dependent upon the secondary containment configuration when testing is being performed. The acceptance criteria for the SRs based on secondary containment configuration is defined as follows:

SECONDARY CONTAINMENT TEST CONFIGURATION	MAXIMUM DRAWDOWN TIME(SEC) (SR 3.6.4.1.4 ACCEPTANCE CRITERIA)	MAXIMUM FLOW RATE (CFM) (SR 3.6.4.1.5 ACCEPTANCE CRITERIA)
Zones I, II and III.	$\leq 125$ Seconds (Zones I, II, and III)	$\leq 4000$ CFM (From Zones I, II, and III)
Zones I and III.	$\leq 117$ Seconds (Zones I and III)	$\leq 2885$ CFM (From Zones I and III)

(continued)



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**BASES**

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**SURVEILLANCE REQUIREMENTS**     SR 3.6.4.1.4 and SR 3.6.4.1.5 (continued)

Only one of the above listed configurations needs to be tested to confirm secondary containment OPERABILITY.

A Note also modifies the Frequency for each SR. This Note identifies that each SR must be performed in the most limiting Secondary Containment Configuration every 60 months. The 60 month Frequency is acceptable because operating experience has shown that these components usually pass the Surveillance and all active components are tested more frequently. Therefore, these tests are used to ensure secondary containment boundary integrity.

Since these SRs are secondary containment tests, they need not be performed with each SGT subsystem. The SGT subsystems are tested on a STAGGERED TEST BASIS, however, to ensure that in addition to the requirements of LCO 3.6.4.3, either SGT subsystem will perform SR 3.6.4.1.4 and SR 3.6.4.1.5. Operating experience has shown these components usually pass the Surveillance when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

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- REFERENCES**
1. FSAR, Section 6.2.3.
  2. FSAR, Section 15.6.
  3. FSAR, Section 15.7.4.
  4. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).
-

## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.4.3 Standby Gas Treatment (SGT) System

#### BASES

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**BACKGROUND** The SGT System is required by 10 CFR 50, Appendix A, GDC 41, "Containment Atmosphere Cleanup" (Ref. 1). The safety 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 two redundant subsystems, each with its own set of dampers, filter train, and a reactor building recirculation fan and associated dampers and controls.

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

- a. A demister;
- 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 handling an incoming air mixture at a maximum of 125°F. The internal pressure of the secondary containment is maintained at a negative pressure of 0.25 inches water gauge when the system is in operation. Maintenance of a negative pressure precludes direct outleakage.

The demister is provided to remove entrained water in the air, while the electric heater reduces the relative humidity of the airstream to less than 70% (Ref. 2). The prefilter removes large particulate matter, while the HEPA filter

(continued)

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## BASES

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### BACKGROUND (continued)

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.

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 in each division, the associated filter train fan starts. Upon verification that both subsystems are operating, the redundant subsystem may be shut down.

The SGT System also contains a cooling function to remove heat generated by fission product decay on the HEPA filters and charcoal adsorbers during shutdown of an SGT subsystem. The cooling function consists of two separate and independent filter cooling modes per SGT subsystem. The two cooling modes are:

- 1) Outside air damper and the filter cooling bypass damper open, allowing outside air to flow through the shutdown SGT subsystem's filter train and exit via the opposite SGT subsystem's exhaust fan.
- 2) Outside air damper opens and the SGT exhaust fan of the shutdown SGT subsystem starts. This configuration draws outside air through the shutdown SGT subsystem's filter train and exits via the associated SGT subsystem's exhaust fan.

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### 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 (Ref. 3).

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### 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

(continued)

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**BASES**

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<b>LCO</b> (continued)	one SGT subsystem in the event of a single active failure. A SGT subsystem is considered OPERABLE when it has an OPERABLE set of dampers, filter train, one reactor building recirculation fan and associated dampers, and associated controls, including instrumentation. (The reactor building recirculation fans and associated dampers are not dedicated to either SGT subsystem. As a result, when any one reactor building recirculation division is not OPERABLE, one arbitrarily determined SGT subsystem is not operable. This interpretation only applies if both divisions of Secondary Containment Isolation logic are operable). This includes the components required for at least one of the two SGTS filter cooling modes.
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<b>APPLICABILITY</b>	<p>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.</p> <p>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 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.</p>
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<b>ACTIONS</b>	<p><u>A.1</u></p> <p>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 DBA occurring during this period.</p>
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(continued)

## **BASES**

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### **ACTIONS (continued)**

#### **B.1 and B.2**

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.

#### **C.1, C.2.1, C.2.2, and C.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 filter train should immediately be placed in operation. This action ensures that the remaining filter train is OPERABLE, that no failures that could prevent automatic actuation have occurred, and that any other failure would be readily detected.

An alternative to Required Action C.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.

The Required Actions of Condition C 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.

(continued)

## **BASES**

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### **ACTIONS (continued)**

#### **D.1**

If both SGT subsystems are inoperable in MODE 1, 2, or 3, the SGT system may not be capable of supporting the required radioactivity release control function. The 4 hour Completion Time provides a period of time to correct the problem that is commensurate with the importance of maintaining the SGT System contribution to secondary containment during MODES 1, 2, and 3. This time period also ensures that the probability of an accident (requiring SGT OPERABILITY) occurring during periods where SGT is inoperable is minimal.

A temporary (one-time) Completion Time is connected to the Completion Time Requirements above (4 hours) with an "OR" connector. The Temporary Completion Time is 48 hours and applies to the replacement of the Reactor Building Recirculating Fan Damper Motors. The Temporary Completion Time of 48 hours may only be used once, and expires on December 31, 2005.

#### **E.1 and E.2**

If at least one SGT subsystem cannot be restored to OPERABLE status within the required Completion Time, 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.

#### **F.1, F.2, and F.3**

When two 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.

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(continued)

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**BASES**

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**ACTIONS**            F.1, F.2, and F.3 (continued)

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

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**SURVEILLANCE  
REQUIREMENTS**    SR 3.6.4.3.1

Operating each SGT filter train for  $\geq 10$  continuous hours ensures that both filter train 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) for  $\geq 10$  continuous hours every 31 days eliminates moisture on the adsorbers and HEPA filters. The 31 day Frequency is consistent with the requirements of Reference 4.

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 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 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 24 month Frequency. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.2.5 overlaps this SR to provide complete testing of the safety function. Therefore, the Frequency was found to be acceptable from a reliability standpoint.

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(continued)

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**BASES**

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**SURVEILLANCE  
REQUIREMENTS**  
(continued)

**SR 3.6.4.3.4**

This SR verifies that both cooling modes for each SGT subsystem are available. Although both cooling modes are tested, only one cooling mode for each SGT subsystem is required for an SGT subsystem to be considered OPERABLE. 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 24 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was found to be acceptable from a reliability standpoint.

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**REFERENCES**

1. 10 CFR 50, Appendix A, GDC 41.
  2. FSAR, Section 6.5.1
  3. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).
  4. Regulatory Guide 1.52, Rev. 2.
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Manual Name: TSB2

Manual Title: TECHNICAL SPECIFICATIONS BASES UNIT 2 MANUAL

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Manual Name: TSB2

Manual Title: TECHNICAL SPECIFICATIONS BASES UNIT 2 MANUAL

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Title: INSTRUMENTATION CONTROL ROOM EMERGENCY OUTSIDE AIR SUPPLY (CREOAS) SYSTEM INSTRUMENTATION

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# SSSES MANUAL

Manual Name: TSB2

Manual Title: TECHNICAL SPECIFICATIONS BASES UNIT 2 MANUAL

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**SUSQUEHANNA STEAM ELECTRIC STATION**  
**LIST OF EFFECTIVE SECTIONS (TECHNICAL SPECIFICATIONS BASES)**

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## B 3.6 CONTAINMENT SYSTEMS

### B 3.6.4.1 Secondary Containment

#### **BASES**

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**BACKGROUND** The secondary containment structure completely encloses the primary containment structure such that a dual-containment design is utilized to limit the spread of radioactivity to the environment to within limits. The function of the secondary containment is to contain, dilute, and hold up fission products that may leak from primary containment into secondary containment following a Design Basis Accident (DBA). In conjunction with operation of the Standby Gas Treatment (SGT) System and closure of certain valves whose lines penetrate the secondary containment, the secondary containment is designed to reduce the activity level of the fission products prior to release to the environment and to isolate and contain fission products that are released during certain operations that take place inside primary containment, when primary containment is not required to be OPERABLE, or that take place outside primary containment (Ref. 1).

The secondary containment is a structure that completely encloses the primary containment and reactor coolant pressure boundary components. This structure forms a control volume that serves to hold up and dilute the fission products. It is possible for the pressure in the control volume to rise relative to the environmental pressure (e.g., due to pump and motor heat load additions).

The secondary containment boundary consists of the reactor building structure and associated removable walls and panels, hatches, doors, dampers, sealed penetrations and valves. The secondary containment is divided into Zone I, Zone II and Zone III, each of which must be OPERABLE depending on plant status and the alignment of the secondary containment boundary. Specifically, the Unit 1 secondary containment boundary can be modified to exclude Zone II. Similarly, the Unit 2 secondary containment boundary can be modified to exclude Zone I. Secondary containment may consist of only Zone III when in MODE 4 or 5 during CORE ALTERATIONS, or during handling of irradiated fuel within the Zone III secondary containment boundary.

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(continued)

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## BASES

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### BACKGROUND (continued)

To prevent ground level exfiltration while allowing the secondary containment to be designed as a conventional structure, the secondary containment requires support systems to maintain the control volume pressure at less than the external pressure. Requirements for the safety related systems are specified separately in LCO 3.6.4.2, "Secondary Containment Isolation Valves (SCIVs)," and LCO 3.6.4.3, "Standby Gas Treatment (SGT) System." When one or more zones are excluded from secondary containment, the specific requirements for support systems will also change (e.g., required secondary containment isolation valves).

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### APPLICABLE SAFETY ANALYSES

There are two principal accidents for which credit is taken for secondary containment OPERABILITY. These are a loss of coolant accident (LOCA) (Ref. 2) and a fuel handling accident inside secondary containment (Ref. 3). The secondary containment performs no active function in response to either of these limiting events; however, its leak tightness is required to ensure that the release of radioactive materials from the primary containment is restricted to those leakage paths and associated leakage rates assumed in the accident analysis and that fission products entrapped within the secondary containment structure will be treated by the SGT System prior to discharge to the environment.

Secondary containment satisfies Criterion 3 of the NRC Policy Statement (Ref. 4).

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### LCO

An OPERABLE secondary containment provides a control volume into which fission products that bypass or leak from primary containment, or are released from the reactor coolant pressure boundary components located in secondary containment, can be diluted and processed prior to release to the environment. For the secondary containment to be considered OPERABLE, it must have adequate leak tightness to ensure that the required vacuum can be established and maintained. The leak tightness of secondary containment must also ensure that the release of radioactive materials to the environment is restricted to those leakage paths and associated leakage rates assumed in the accident analysis. For example, secondary containment bypass leakage must be restricted to the leakage rate required by LCO 3.6.1.3. The secondary containment boundary required to be OPERABLE is dependent on the operating status of both units, as well as the configuration of walls, doors, hatches, SCIVs, and available flow paths to the SGT System.

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(continued)

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**BASES (continued)**

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**APPLICABILITY** In MODES 1, 2, and 3, a LOCA could lead to a fission product release to primary containment that leaks to secondary containment. Therefore, secondary containment OPERABILITY is required during the same operating conditions that require primary containment OPERABILITY.

In MODES 4 and 5, the probability and consequences of the LOCA are reduced due to the pressure and temperature limitations in these MODES. Therefore, maintaining secondary containment OPERABLE is not required in MODE 4 or 5 to ensure a control volume, except for other situations for 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.

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**ACTIONS**

**A.1**

If secondary containment is inoperable, it must be restored to OPERABLE status within 4 hours. The 4 hour Completion Time provides a period of time to correct the problem that is commensurate with the importance of maintaining secondary containment during MODES 1, 2, and 3. This time period also ensures that the probability of an accident (requiring secondary containment OPERABILITY) occurring during periods where secondary containment is inoperable is minimal.

A temporary (one-time) Completion Time is connected to the Completion Time Requirements above (4 hours) with an "OR" connector. The Temporary Completion Time is 48 hours and applies to the replacement of the Reactor Building Recirculating Fan Damper Motors. The Temporary Completion Time of 48 hours may only be used once, and expires on December 31, 2005.

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(continued)

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**BASES**

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**ACTIONS**  
(continued)

B.1 and B.2

If secondary containment cannot be restored to OPERABLE status within the required Completion Time, 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.

C.1, C.2, and C.3

Movement of irradiated fuel assemblies in the secondary containment, CORE ALTERATIONS, and OPDRVs can be postulated to cause fission product release to the secondary containment. In such cases, the secondary containment is the only barrier to release of fission products to the environment. CORE ALTERATIONS and movement of irradiated fuel assemblies must be immediately suspended if the secondary containment is inoperable.

Suspension of these activities shall not preclude completing an action that involves moving a component to a safe position. Also, action must be immediately initiated to suspend OPDRVs to minimize the probability of a vessel draindown and subsequent potential for fission product release. Actions must continue until OPDRVs are suspended.

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

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**SURVEILLANCE**  
**REQUIREMENTS**

SR 3.6.4.1.1

This SR ensures that the secondary containment boundary is sufficiently leak tight to preclude exfiltration.

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(continued)

## **BASES**

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### **SURVEILLANCE REQUIREMENTS**    SR 3.6.4.1.1 (continued)

The 24 hour Frequency of this SR was developed based on operating experience related to secondary containment vacuum variations during the applicable MODES and the low probability of a DBA occurring between surveillances.

Furthermore, the 24 hour Frequency is considered adequate in view of other indications available in the control room, including alarms, to alert the operator to an abnormal secondary containment vacuum condition.

#### SR 3.6.4.1.2 and SR 3.6.4.1.3

Verifying that secondary containment equipment hatches, removable walls and one access door in each access opening required to be closed are closed ensures that the infiltration of outside air of such a magnitude as to prevent maintaining the desired negative pressure does not occur.

Verifying that all such openings are closed also provides adequate assurance that exfiltration from the secondary containment will not occur. In this application, the term "sealed" has no connotation of leak tightness.

An access opening typically contains one inner and one outer door. Maintaining secondary containment OPERABILITY requires verifying one door in each access opening to secondary containment zones is closed. In some cases (e.g., railroad bay), secondary containment access openings are shared such that a secondary containment barrier may have multiple inner or multiple outer doors. The intent is to maintain the secondary containment barrier intact, which is achieved by maintaining the inner or outer portion of the barrier closed at all times. However, all secondary containment access doors are normally kept closed, except when the access opening is being used for entry and exit or when maintenance is being performed on an access opening.

When the railroad bay door (No. 101) is closed; all Zone I and III hatches, removable walls, dampers, and one door in each access opening connected to the railroad access bay are closed; or, only Zone I removable walls and/or doors are open to the railroad access shaft; or, only Zone III hatches and/or dampers are open to the railroad access shaft. When the railroad bay door (No. 101) is open; all Zone I and III hatches, removable walls, dampers, and one door in each access opening connected to the railroad access bay are closed. The truck bay hatch is closed and the truck bay door (No. 102) is closed unless Zone II is isolated from Zones I and III.

(continued)

**BASES**

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**SURVEILLANCE REQUIREMENTS**      SR 3.6.4.1.2 and SR 3.6.4.1.3 (continued)

When an access opening between secondary containment zones is being used for exit and entry, then at least one door (where two doors are provided) must remain closed. The access openings between secondary containment zones which are not provided with two doors are administratively controlled to maintain secondary containment integrity during exit and entry. This Surveillance is modified by a Note that allows access openings with a single door (i.e., no airlock) within the secondary containment boundary (i.e., between required secondary containment zones) to be opened for entry and exit. Opening of an access door for entry and exit allows sufficient administrative control by individual personnel making the entries and exits to assure the secondary containment function is not degraded. When one of the zones is not a zone required for secondary containment OPERABILITY, the Note allowance would not apply.

The 31 day Frequency for these SRs has been shown to be adequate, based on operating experience, and is considered adequate in view of the other indications of door and hatch status that are available to the operator.

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(continued)

## **BASES**

### **SURVEILLANCE REQUIREMENTS (continued)**

#### **SR 3.6.4.1.4 and SR 3.6.4.1.5**

The SGT System exhausts the secondary containment atmosphere to the environment through appropriate treatment equipment. To ensure that all fission products are treated, SR 3.6.4.1.4 verifies that the SGT System will rapidly establish and maintain a pressure in the secondary containment that is less than the pressure external to the secondary containment boundary. This is confirmed by demonstrating that one SGT subsystem will draw down the secondary containment to  $\geq 0.25$  inches of vacuum water gauge in less than or equal to the maximum time allowed. This cannot be accomplished if the secondary containment boundary is not intact. SR 3.6.4.1.5 demonstrates that one SGT subsystem can maintain  $\geq 0.25$  inches of vacuum water gauge for at least 1 hour at less than or equal to the maximum flow rate permitted for the secondary containment configuration that is operable. The 1 hour test period allows secondary containment to be in thermal equilibrium at steady state conditions. As noted, both SR 3.6.4.1.4 and SR 3.6.4.1.5 acceptance limits are dependent upon the secondary containment configuration when testing is being performed. The acceptance criteria for the SRs based on secondary containment configuration is defined as follows:

SECONDARY CONTAINMENT TEST CONFIGURATION	MAXIMUM DRAWDOWN TIME(SEC) (SR 3.6.4.1.4 ACCEPTANCE CRITERIA)	MAXIMUM FLOW RATE (CFM) (SR 3.6.4.1.5 ACCEPTANCE CRITERIA)
Zones I, II and III.	$\leq 125$ Seconds (Zones I, II, and III)	$\leq 4000$ CFM (From Zones I, II, and III)
Zones II and III.	$\leq 118$ Seconds (Zones II and III)	$\leq 2960$ CFM (From Zones II and III)

Only one of the above listed configurations needs to be tested to confirm secondary containment OPERABILITY.

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## BASES

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### SURVEILLANCE REQUIREMENTS SR 3.6.4.1.4 and SR 3.6.4.1.5 (continued)

A Note also modifies the Frequency for each SR. This Note identifies that each SR must be performed in the most limiting Secondary Containment Configuration every 60 months. The 60 month Frequency is acceptable because operating experience has shown that these components usually pass the Surveillance and all active components are tested more frequently. Therefore, these tests are used to ensure secondary containment boundary integrity.

Since these SRs are secondary containment tests, they need not be performed with each SGT subsystem. The SGT subsystems are tested on a STAGGERED TEST BASIS, however, to ensure that in addition to the requirements of LCO 3.6.4.3, either SGT subsystem will perform SR 3.6.4.1.4 and SR 3.6.4.1.5. Operating experience has shown these components usually pass the Surveillance when performed at the 24 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

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### REFERENCES

1. FSAR, Section 6.2.3.
  2. FSAR, Section 15.6.
  3. FSAR, Section 15.7.4.
  4. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).
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## 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 safety 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 two redundant subsystems, each with its own set of dampers, filter train, and a reactor building recirculation fan and associated dampers and controls.

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

- a. A demister;
- 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 handling an incoming air mixture at a maximum of 125°F. The internal pressure of the secondary containment is maintained at a negative pressure of 0.25 inches water gauge when the system is in operation. Maintenance of a negative pressure precludes direct outleakage.

The demister is provided to remove entrained water in the air, while the electric heater reduces the relative humidity of the airstream to less than 70% (Ref. 2). The prefilter removes large particulate matter, while the HEPA filter

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## BASES

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### BACKGROUND (continued)

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.

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 in each division, the associated filter train fan starts. Upon verification that both subsystems are operating, the redundant subsystem may be shut down.

The SGT System also contains a cooling function to remove heat generated by fission product decay on the HEPA filters and charcoal adsorbers during shutdown of an SGT subsystem. The cooling function consists of two separate and independent filter cooling modes per SGT subsystem. The two cooling modes are:

- 1) Outside air damper and the filter cooling bypass damper open, allowing outside air to flow through the shutdown SGT subsystem's filter train and exit via the opposite SGT subsystem's exhaust fan.
- 2) Outside air damper opens and the SGT exhaust fan of the shutdown SGT subsystem starts. This configuration draws outside air through the shutdown SGT subsystem's filter train and exits via the associated SGT subsystem's exhaust fan.

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### 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 (Ref. 3).

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### 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

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## BASES

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### LCO (continued)

one SGT subsystem in the event of a single active failure. A SGT subsystem is considered OPERABLE when it has an OPERABLE set of dampers, filter train, one reactor building recirculation fan and associated dampers, and associated controls, including instrumentation. (The reactor building recirculation fans and associated dampers are not dedicated to either SGT subsystem. As a result, when any one reactor building recirculation division is not OPERABLE, one arbitrarily determined SGT subsystem is not operable. This interpretation only applies if both divisions of Secondary Containment Isolation logic are operable). This includes the components required for at least one of the two SGTS filter cooling modes.

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### 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 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.

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### ACTIONS

#### A.1

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 DBA occurring during this period.

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## **BASES**

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### **ACTIONS (continued)**

#### **B.1 and B.2**

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.

#### **C.1, C.2.1, C.2.2, and C.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 filter train should immediately be placed in operation. This action ensures that the remaining filter train is OPERABLE, that no failures that could prevent automatic actuation have occurred, and that any other failure would be readily detected.

An alternative to Required Action C.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.

The Required Actions of Condition C 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.

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**BASES**

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**ACTIONS**  
(continued)

**D.1**

If both SGT subsystems are inoperable in MODE 1, 2, or 3, the SGT system may not be capable of supporting the required radioactivity release control function. The 4 hour Completion Time provides a period of time to correct

the problem that is commensurate with the importance of maintaining the SGT System contribution to secondary containment during MODES 1, 2, and 3. This time period also ensures that the probability of an accident (requiring SGT OPERABILITY) occurring during periods where SGT is inoperable is minimal.

A temporary (one-time) Completion Time is connected to the Completion Time Requirements above (4 hours) with an "OR" connector. The Temporary Completion Time is 48 hours and applies to the replacement of the Reactor Building Recirculating Fan Damper Motors. The Temporary Completion Time of 48 hours may only be used once, and expires on December 31, 2005.

**E.1 and E.2**

If at least one SGT subsystem cannot be restored to OPERABLE status within the required Completion Time, 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.

**F.1, F.2, and F.3**

When two 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.

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BASES (continued)

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**ACTIONS**

F.1, F.2, and F.3 (continued)

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

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**SURVEILLANCE  
REQUIREMENTS**

SR 3.6.4.3.1

Operating each SGT filter train for  $\geq 10$  continuous hours ensures that both filter train 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) for  $\geq 10$  continuous hours every 31 days eliminates moisture on the adsorbers and HEPA filters. The 31 day Frequency is consistent with the requirements of Reference 4.

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 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 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 24 month Frequency. The LOGIC SYSTEM FUNCTIONAL TEST in SR 3.3.6.2.5 overlaps this SR to provide complete testing of the safety function. Therefore, the Frequency was found to be acceptable from a reliability standpoint.

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**BASES**

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**SURVEILLANCE  
REQUIREMENTS**  
(continued)

**SR 3.6.4.3.4**

This SR verifies that both cooling modes for each SGT subsystem are available. Although both cooling modes are tested, only one cooling mode for each SGT subsystem is required for an SGT subsystem to be considered OPERABLE. 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 24 month Frequency, which is based on the refueling cycle. Therefore, the Frequency was found to be acceptable from a reliability standpoint.

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**REFERENCES**

1. 10 CFR 50, Appendix A, GDC 41.
  2. FSAR, Section 6.5.1
  3. Final Policy Statement on Technical Specifications Improvements, July 22, 1993 (58 FR 39132).
  4. Regulatory Guide 1.52, Rev. 2.
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