MARK UP OF ITS CHANGE

OI 3.7.7; Review of CC pump and flow requirements

OI 3.7.7 revises LCO 3.7.7 BASES to address number of required CC pumps based upon CC System flow requirements.

3.7 PLANT SYSTEMS

3.7.7 Component Cooling (CC) System

LCO 3.7.7 The CC System shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

-----------------------------------NOTE-----------------------------------
Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops – MODE 4," for residual heat removal loops made inoperable by CC.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required CC heat exchanger inoperable with both units in MODES 1, 2, 3, or 4.	A.1 Restore required CC heat exchanger to OPERABLE status.	7 days
B. One required CC heat exchanger inoperable with one unit in MODES 1, 2, 3, or 4.	B.1 Restore required CC heat exchanger to OPERABLE status	30 days
AC. One required CC pump inoperable. OR One required flow path inoperable.	AC.1 Restore required CC pump to OPERABLE status. OR AC.2 Restore required CC flow path to OPERABLE status.	7 days 7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
~~B~~D. One required CC pump inoperable. AND One required CC flow path inoperable.	~~B~~D.1	Restore the required CC pump to OPERABLE status.	24 hours
	OR		
	~~B~~D.2	Restore the required CC flow path to OPERABLE status.	24 hours
~~C~~E. Required Action and associated Completion Time not met. OR Two required CC pumps inoperable	~~C~~E.1	Be in MODE 3.	6 hours
	AND		
	~~C~~E.2	Be in MODE 5.	36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.7.1	Verify each CC pump starts automatically on an actual or simulated actuation signal.	18 months

B 3.7 PLANT SYSTEMS

3.7.7 Component Cooling (CC) System

BASES

BACKGROUND

The CC System is a shared system which provides a heat sink for the removal of process and operating heat from safety related components during a Design Basis Accident (DBA) or transient. During normal operation, the CC System also provides this function for various nonessential components, as well as the spent fuel storage pool. The CC System serves as a barrier to the release of radioactive byproducts between potentially radioactive systems and the Service Water System, and thus to the environment.

The CC System consists of five CC pumps, three CC heat exchangers, ~~and~~ two surge tanks, and associated valves and piping which support the two units. The CC System contains redundant safety-related flow paths. A flow path consists of the piping and valves necessary to provide cooling water to the RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump. To consider a flowpath OPERABLE it must be either aligned or capable of being aligned to its required safety-related loads, and be supported by a CC heat exchanger and a surge tank. Each pump is supplied from a separate emergency diesel generator. The five pumps supply flow to the three heat exchangers via a common header, however each pump or heat exchanger can be isolated from the others without affecting the remaining flow paths. The surge tanks in the system provide assurance that adequate net positive suction head is available.

~~During operation in MODES 1, 2, 3, and 4, one pump, flowpath, and heat exchanger per unit are capable of serving all operating components. In the event of a loss of coolant accident (LOCA) on one unit, one pump, flowpath, and heat exchanger are capable of fulfilling system requirements for that unit. The second required pump, flowpath, and heat exchanger provide the required redundancy in the event of a single active or passive failure. Since the CC System is shared between units, one heat exchanger and associated portions its flow path, may be credited to both units. Each pump automatically starts upon receipt of a safety injection signal (from its associated unit) or from the safe shutdown sequencer by the Loss of Power Diesel Generator Start Instrumentation, LCO 3.3.5. Three pumps are normally~~

(continued)

BASES

~~associated with Unit 1 (0CC005 0C, 0CC006 0D, and 0CC007 0E) and two pumps are normally associated with Unit 2 (0CC003 0A, and 0CC004 0B)).~~
To support the capability to cool down to MODES 5 or 6 (either normal or post-accident), a single flow path capable of cooling an RHR heat exchanger is required. When a unit is in MODES 5 or 6, the number of required flow paths is dependent on the number of required RHR loops (needed to maintain MODES 5 or 6) per Specification 3.4.7, 3.9.4, or 3.9.5, but is always at least one. When a unit is defueled, there is no requirement for the RHR flow path. The flow demand associated with each Safety Related flow path can be met by one CC pump per flow path. Therefore, a minimum of one flow path (and consequently one CC pump) is required for each unit in MODES 1, 2, 3, 4, 5 or 6.

The CC System also provides cooling to the following loads which are not required for accident mitigation purposes, but may be required for plant operation:

a. Reactor coolant pump motors and thermal barriers,
b. Letdown heat exchanger,
c. Excess letdown heat exchanger,
d. Seal water heat exchanger,
e. Spent fuel pool heat exchanger,
f. RCS sample heat exchangers,
g. Reactor vessel support cooling,
h. Waste gas compressors, and
i. Failed fuel monitor cooling.

The flow demand associated with these loads can be met by one CC pump and is the equivalent demand of one RHR flow path described above.

Therefore, a total of three CC pumps are required whenever one unit is in MODES 1, 2, 3 or 4, and the other unit is in MODES 1, 2, 3, 4, 5 or 6. A total of two CC pumps are required whenever one unit is in MODES 1, 2, 3 or 4, and the other unit is defueled.

Each CC heat exchanger is sized to handle the equivalent of two flow paths (or the equivalent of two CC pumps).

Therefore, a total of two CC heat exchangers are required whenever one unit is in MODES 1, 2, 3 or 4, and the other unit is in MODES 1, 2, 3, 4, 5 or 6. A total of one CC heat

(continued)

BASES

exchanger is required whenever one unit is in MODES 1, 2, 3 or 4, and the other unit is defueled.

The flow path, pump and heat exchanger redundancy requirements are independent of each other. An additional CC pump is required to meet single failure criteria, and an additional CC heat exchanger is required to meet passive single failure protection criteria. Redundancy requirements for RHR flow paths are unit specific, and do not impact CC pump or CC heat exchanger requirements. Additional CC pumps or heat exchangers are required because of potential failures of these components.

Each pump automatically starts upon receipt of a safety injection signal (from its associated unit) or from the safe shutdown sequencer by the Loss of Power Diesel Generator Start Instrumentation, LCO 3.3.5. Three pumps are normally associated with Unit 1 (0CC005-0C, 0CC006-0D, and 0CC007-0E) and two pumps are normally associated with Unit 2 (0CC003-0A, and 0CC004-0B)).

Additional information on the design and operation of the system, along with a list of the components served, is presented in the UFSAR, Section 9.2.2 (Ref. 1).

The principal safety related function of the CC System is the removal of decay heat from the reactor via the Residual Heat Removal (RHR) System. This may be during a normal or post accident cooldown and shutdown.

APPLICABLE ~~SAFETY~~ ANALYSES

The design basis of the CC System is ~~for one CC train (which includes one CC pump, heat exchanger, and flow path)~~ to remove the post LOCA heat load from the containment recirculation sump of the affected unit during the recirculation phase, and simultaneously, remove the normal shutdown heat load from the unaffected unit.

~~The CC System is designed to limit the CC System supply temperature to 95°F during normal operation. However, during plant cooldown, the CC supply temperature is allowed to increase to 120°F for about three hours to expedite plant cooldown, when the Residual Heat Removal System is first placed in service.~~

(continued)

BASES (continued)

The design prevents the containment recirculation sump fluid from increasing in temperature during the recirculation phase following a LOCA, and provides a gradual reduction in the temperature of this fluid as it is supplied to the Reactor Coolant System (RCS) by the Emergency Core Cooling System (ECCS) pumps.

An OPERABLE CC System provides the required redundancy to ensure that the CC System safety functions can be accomplished assuming either; 1) loss of the onsite electric power system (diesel generators) assuming offsite power is available, or 2) loss of the offsite electric power system assuming onsite power (diesel generators) is available, coincident with a single failure (a passive failure is only assumed during the recirculation phase). Passive failures resulting in a breech of the CC System fluid boundary are assumed to result in a maximum leakage of 50 gallons per minute. Further, redundant components and means of isolation are provided so that the CC System may be separated to serve each unit independently during normal cooldown and following a LOCA.

APPLICABLE SAFETY ANALYSIS (continued)

The CC System also functions to cool the unit from RHR entry conditions to MODE 5 during normal and post accident operations. The time required for this cooldown is a function of the CC components and RHR subsystems operating. One CC pump and heat exchanger are sufficient to remove decay heat during subsequent operations in MODES 5 and 6. This assumes a maximum service water temperature of 80°F occurring simultaneously with the maximum heat loads on the system.

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

LCO

~~In the event of a DBA, one CC pump, heat exchanger and flow path are required to provide the minimum heat removal capability assumed in the safety analysis for the systems to which it supplies cooling water on the affected unit. To ensure this requirement is met, two pumps and two flow paths (each with one heat exchanger and surge tank) must be OPERABLE, assuming the worst case single failure.~~

~~The CC System is normally operated as a shared system that~~

(continued)

~~provides cooling to equipment in both units. As such, some components can satisfy requirements on both units. Since the CC System is shared between units, one heat exchanger and associated portions its flow path, may be credited to both units.~~

~~Therefore, with both units operating in MODES 1, 2, 3, or 4, the CC System is required to be OPERABLE with:~~

~~a. Three CC flow paths (two per unit, of which one can be shared) each consisting of, a heat exchanger, piping, surge tank, and valves;~~

~~b. Four CC pumps;~~

~~c. Associated instrumentation and controls required to perform the safety related function.~~

The CC system is normally operated as a shared system that provides cooling to equipment on both units. Therefore, the Modes of both units must be considered for determining the requirements for an OPERABLE CC System.

System operation with the common heat exchanger flow path shared between the two units is acceptable for the CC System. Furthermore, a heat exchanger does not need to be ~~in service~~valved in to be considered OPERABLE; manual isolation does not affect OPERABILITY since the component is capable of being aligned and is not required until the recirculation phase of a LOCA. In addition, a surge tank does not need to be valved in to be considered OPERABLE.

For both units in MODES 1, 2, 3, or 4, the CC System is required to be OPERABLE with:

a. Four CC pumps,

b. Three CC heat exchangers,

c. Two redundant flow paths to capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump for each unit in MODES 1, 2, 3, or 4,

d. Two surge tanks, and

(continued)

e. Associated piping and valves.

For a single unit in MODES 1, 2, 3, or 4, with the second unit in MODES 5, or 6, the CC System is required to be OPERABLE with:

a. Four CC pumps,

b. Three CC heat exchangers,

c. Two redundant flow paths to capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump for each unit in MODES 1, 2, 3, or 4 (NOTE: For the unit that is in MODES 5 or 6, the number of required flow paths is dependent on the number of required RHR loops per specifications 3.4.7, 3.9.4 or 3.9.5.),

d. Two surge tanks, and

e. Associated piping and valves.

~~While not addressed by this LCO, for a unit in MODE 5 or 6, the CC System is required in support of systems required to be OPERABLE. This will typically require the following in support of the RHR System:~~

~~a. One CC flow path consisting of a heat exchanger, piping, surge tank, and valves);~~

~~b. One CC pump;~~

~~c. Associated instrumentation and controls required to perform the RHR function.~~

~~As previously addressed, the CC System is operated as a shared system that provides cooling to the equipment on both units. As such, some of the components can satisfy the requirements on both units. For one unit in MODE 1, 2, 3, or 4 and the second unit in MODE 5 or 6, the CC System is required to be OPERABLE with:~~

~~a. Two CC flow paths each consisting of; a heat exchanger, piping, surge tank, and valves (two flow paths in support of the unit in MODE 1, 2, 3, or 4, and one flow path in support of the unit in MODE 5 or~~

(continued)

~~6, which can be shared);~~

~~b. Three CC pumps;~~

~~c. Associated instrumentation and controls required to perform the safety related function.~~

For a single unit in MODE 1, 2, 3, or 4, with the second unit in a defueled condition, the CC System is required to be OPERABLE with:

a. Three CC pumps,

b. Two CC heat exchangers,

c. Two redundant flow paths capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump,

d. Two surge tanks, and

e. Associated piping and valves.

~~a. Two CC flow paths each consisting of; a heat exchanger, piping, surge tank, and valves;~~

~~b. Two CC pumps~~

~~c. Associated instrumentation and controls required to perform the safety related function.~~

The OPERABILITY of each CC pump includes the capability to automatically start upon actuation of the Loss of Power Diesel Generator Start Instrumentation. The OPERABILITY of each CC pump in MODES 1, 2, 3, or 4 also includes the capability to start automatically when required to support the safety injection function. This requires that the diesel generator associated with each OPERABLE CC pump is OPERABLE.

APPLICABILITY

In MODES 1, 2, 3, and 4, the CC System is a normally operating system, which must be manually aligned to perform its post accident safety functions, primarily RCS heat removal, which is achieved by cooling the RHR heat exchanger.

(continued)

BASES

~~In~~ With both units in MODE 5 or 6, the OPERABILITY requirements of the CC System are determined by the systems it supports, specifically, the CC System flow path to the RHR heat exchanger.

ACTIONS

The ACTIONS are modified by a Note indicating that the applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops - MODE 4," must be entered if an inoperable CC component(s) renders an RHR loop inoperable (incapable of removing decay heat). This is an exception to LCO 3.0.6, which directs the Required Actions of LCO 3.4.6 to be taken in addition to the Required Actions of this LCO.

A.1

If one CC heat exchanger is inoperable with both units in MODES 1, 2, 3, or 4, action must be taken to restore the inoperable CC heat exchanger to OPERABLE status. Seven days are provided to restore the inoperable CC heat exchanger. At the end of seven days, both units must be shutdown. In lieu of shutting down both units, however, one unit may be place into at least MODE 5 during the seven day period, which allows Condition A to be exited. However, Condition B is still in effect.

One CC heat exchanger is able to support both redundant flow paths capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump. Therefore one inoperable CC heat exchanger removes only the single passive failure protection redundancy. The remaining CC heat exchanger(s) have the capability of supporting all CC flow paths. The completion time is reasonable, based on the redundant capabilities afforded by OPERABLE CC pumps and flow paths during this time period.

B.1

If one CC heat exchanger is inoperable with only one unit in MODES 1, 2, 3, or 4, then action must be taken to restore the required CC heat exchanger within 30 days. With both units in MODES 1, 2, 3, or 4, both Condition A and Condition B are entered, and Condition A is the controlling clock until one unit is shutdown. When at least one unit is in MODES 5 or 6, Condition B becomes the only applicable

(continued)

Condition. If one unit is dafueled, the number of required CC heat exchangers is two, so the Condition will no longer be applicable with only one heat exchanger inoperable.

One CC heat exchanger is able to support both redundant flow paths capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump. Therefore one inoperable CC heat exchanger removes only the single passive failure protection redundancy. The remaining CC heat exchanger(s) have the capability of supporting all CC flow paths. The completion time is reasonable, based on the redundant capabilities afforded by OPERABLE CC pumps and flow paths during this time period.

AC.1 and AC.2

If one required CC pump, or flow path capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump, is inoperable, action must be taken to restore the required pump or flow paths to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE CC pump ~~or~~and flow path ~~is~~are adequate to provide the required cooling. The 7 day Completion Time is reasonable, based on the redundant capabilities afforded by the OPERABLE pumps and flow path, and the low probability of a DBA occurring during this period.

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ACTIONS (continued)

BD.1 and BD.2

If one CC pump and one CC flow path capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump, are inoperable, action must be taken to restore the CC pump or the CC flow path to OPERABLE status within 24 hours. ~~In this Condition, the remaining OPERABLE CC pumps and flow path is adequate to perform the heat removal function. The 24 hour Completion Time is reasonable, based on the redundant capabilities afforded by the OPERABLE pumps and flow path, and the low probability of a DBA occurring during this period.~~In this condition, it is acceptable to continue operation for 24 hours without a redundant CC pump and a redundant flow path. This is because in this condition the remaining OPERABLE CC pumps and flow path are adequate to provide the required cooling, and there is a low probability of a DBA occurring during this period.

CE.1 and CE.2

If the CC component(s) cannot be restored to OPERABLE status within the associated Completion Time, or if two required CC pumps are inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.7.1

This SR verifies proper automatic operation of the CC pumps on an actual or simulated actuation signal (i.e., safety injection, and safe shutdown sequencer by the Loss of Power Diesel Generator Start Instrumentation, LCO 3.3.5). The CC System is a normally operating system that is not typically actuated as part of routine testing during normal operation.

The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month

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3.7 PLANT SYSTEMS

3.7.7 Component Cooling (CC) System

LCO 3.7.7 The CC System shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

-----NOTE-----
Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops - MODE 4," for residual heat removal loops made inoperable by CC.

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required CC heat exchanger inoperable with both units in MODES 1, 2, 3, or 4.	A.1 Restore required CC heat exchanger to OPERABLE status.	7 days
B. One required CC heat exchanger inoperable with one unit in MODES 1, 2, 3, or 4.	B.1 Restore required CC heat exchanger to OPERABLE status	30 days
C. One required CC pump inoperable. <u>OR</u> One required flow path inoperable.	C.1 Restore required CC pump to OPERABLE status. <u>OR</u> C.2 Restore required CC flow path to OPERABLE status.	7 days 7 days

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
D. One required CC pump inoperable. AND One required CC flow path inoperable.	D.1 Restore the required CC pump to OPERABLE status. OR D.2 Restore the required CC flow path to OPERABLE status.	24 hours 24 hours
E. Required Action and associated Completion Time not met. OR Two required CC pumps inoperable	E.1 Be in MODE 3. AND E.2 Be in MODE 5.	6 hours 36 hours

SURVEILLANCE REQUIREMENTS

SURVEILLANCE	FREQUENCY
SR 3.7.7.1 Verify each CC pump starts automatically on an actual or simulated actuation signal.	18 months

B 3.7 PLANT SYSTEMS

3.7.7 Component Cooling (CC) System

BASES

BACKGROUND

The CC System is a shared system which provides a heat sink for the removal of process and operating heat from safety related components during a Design Basis Accident (DBA) or transient. During normal operation, the CC System also provides this function for various nonessential components, as well as the spent fuel storage pool. The CC System serves as a barrier to the release of radioactive byproducts between potentially radioactive systems and the Service Water System, and thus to the environment.

The CC System consists of five CC pumps, three CC heat exchangers, two surge tanks, and associated valves and piping which support the two units. The CC System contains redundant safety-related flow paths. A flow path consists of the piping and valves necessary to provide cooling water to the RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump. To consider a flowpath OPERABLE it must be either aligned or capable of being aligned to its required safety-related loads, and be supported by a CC heat exchanger and a surge tank. Each pump is supplied from a separate emergency diesel generator. The five pumps supply flow to the three heat exchangers via a common header, however each pump or heat exchanger can be isolated from the others without affecting the remaining flow paths. The surge tanks in the system provide assurance that adequate net positive suction head is available.

To support the capability to cool down to MODES 5 or 6 (either normal or post-accident), a single flow path capable of cooling an RHR heat exchanger is required. When a unit is in MODES 5 or 6, the number of required flow paths is dependent on the number of required RHR loops (needed to maintain MODES 5 or 6) per Specification 3.4.7, 3.9.4, or 3.9.5, but is always at least one. When a unit is defueled, there is no requirement for the RHR flow path. The flow demand associated with each Safety Related flow path can be met by one CC pump per flow path. Therefore, a minimum of one flow path (and consequently one CC pump) is required for each unit in MODES 1, 2, 3, 4, 5 or 6.

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BASES

BACKGROUND (continued)

The CC System also provides cooling to the following loads which are not required for accident mitigation purposes, but may be required for plant operation:

a. Reactor coolant pump motors and thermal barriers,
b. Letdown heat exchanger,
c. Excess letdown heat exchanger,
d. Seal water heat exchanger,
e. Spent fuel pool heat exchanger,
f. RCS sample heat exchangers,
g. Reactor vessel support cooling,
h. Waste gas compressors, and
i. Failed fuel monitor cooling.

The flow demand associated with these loads can be met by one CC pump and is the equivalent demand of one PHR flow path described above.

Therefore, a total of three CC pumps are required whenever one unit is in MODES 1, 2, 3 or 4, and the other unit is in MODES 1, 2, 3, 4, 5 or 6. A total of two CC pumps are required whenever one unit is in MODES 1, 2, 3 or 4, and the other unit is defueled.

Each CC heat exchanger is sized to handle the equivalent of two flow paths (or the equivalent of two CC pumps).

Therefore, a total of two CC heat exchangers are required whenever one unit is in MODES 1, 2, 3 or 4, and the other unit is in MODES 1, 2, 3, 4, 5 or 6. A total of one CC heat exchanger is required whenever one unit is in MODES 1, 2, 3 or 4, and the other unit is defueled.

The flow path, pump and heat exchanger redundancy requirements are independent of each other. An additional CC pump is required to meet single failure criteria, and an additional CC heat exchanger is required to meet passive single failure protection criteria. Redundancy requirements for RHR flow paths are unit specific, and do not impact CC pump or CC heat exchanger requirements. Additional CC pumps or heat exchangers are required because of potential failures of these components.

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BASES

BACKGROUND (continued)

Each pump automatically starts upon receipt of a safety injection signal (from its associated unit) or from the safe shutdown sequencer by the Loss of Power Diesel Generator Start Instrumentation, LCO 3.3.5. Three pumps are normally associated with Unit 1 (0CC005-0C, 0CC006-0D, and 0CC007-0E) and two pumps are normally associated with Unit 2 (0CC003-0A, and 0CC004-0B)).

Additional information on the design and operation of the system, along with a list of the components served, is presented in the UFSAR, Section 9.2.2 (Ref. 1).

The principal safety related function of the CC System is the removal of decay heat from the reactor via the Residual Heat Removal (RHR) System. This may be during a normal or post accident cooldown and shutdown.

APPLICABLE SAFETY ANALYSIS

The design basis of the CC System is to remove the post LOCA heat load from the containment recirculation sump of the affected unit during the recirculation phase, and simultaneously, remove the normal shutdown heat load from the unaffected unit.

The design prevents the containment recirculation sump fluid from increasing in temperature during the recirculation phase following a LOCA, and provides a gradual reduction in the temperature of this fluid as it is supplied to the Reactor Coolant System (RCS) by the Emergency Core Cooling System (ECCS) pumps.

An OPERABLE CC System provides the required redundancy to ensure that the CC System safety functions can be accomplished assuming either; 1) loss of the onsite electric power system (diesel generators) assuming offsite power is available, or 2) loss of the offsite electric power system assuming onsite power (diesel generators) is available, coincident with a single failure (a passive failure is only assumed during the recirculation phase). Passive failures resulting in a breech of the CC System fluid boundary are assumed to result in a maximum leakage of 50 gallons per minute. Further, redundant components and means of isolation are provided so that the CC System may be separated to serve each unit independently during normal cooldown and following a LOCA.

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BASES

LCO
(continued)

For a single unit in MODES 1, 2, 3, or 4, with the second unit in MODES 5, or 6, the CC System is required to be OPERABLE with:

a. Four CC pumps,

b. Three CC heat exchangers,

c. Two redundant flow paths to capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump for each unit in MODES 1, 2, 3, or 4 (NOTE: For the unit that is in MODES 5 or 6, the number of required flow paths is dependent on the number of required RHR loops per specifications 3.4.7, 3.9.4 or 3.9.5.),

d. Two surge tanks, and

e. Associated piping and valves.

For a single unit in MODE 1, 2, 3, or 4, with the second unit in a defueled condition, the CC System is required to be OPERABLE with:

a. Three CC pumps,

b. Two CC heat exchangers,

c. Two redundant flow paths capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump,

d. Two surge tanks, and

e. Associated piping and valves.

The OPERABILITY of each CC pump includes the capability to automatically start upon actuation of the Loss of Power Diesel Generator Start Instrumentation. The OPERABILITY of each CC pump in MODES 1, 2, 3, or 4 also includes the capability to start automatically when required to support the safety injection function. This requires that the diesel generator associated with each OPERABLE CC pump is OPERABLE.

(continued)

BASES

APPLICABLE SAFETY ANALYSIS (continued)

The CC System also functions to cool the unit from RHR entry conditions to MODE 5 during normal and post accident operations. The time required for this cooldown is a function of the CC components and RHR subsystems operating. One CC pump and heat exchanger are sufficient to remove decay heat during subsequent operations in MODES 5 and 6. This assumes a maximum service water temperature of 80°F occurring simultaneously with the maximum heat loads on the system.

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

LCO

The CC system is normally operated as a shared system that provides cooling to equipment on both units. Therefore, the Modes of both units must be considered for determining the requirements for an OPERABLE CC System.

System operation with the common heat exchanger flow path shared between the two units is acceptable for the CC System. Furthermore, a heat exchanger does not need to be valved in to be considered OPERABLE; manual isolation does not affect OPERABILITY since the component is capable of being aligned and is not required until the recirculation phase of a LOCA. In addition, a surge tank does not need to be valved in to be considered OPERABLE.

For both units in MODES 1, 2, 3, or 4, the CC System is required to be OPERABLE with:

a. Four CC pumps,

b. Three CC heat exchangers,

c. Two redundant flow paths to capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump for each unit in MODES 1, 2, 3, or 4,

d. Two surge tanks, and

e. Associated piping and valves.

(continued)

BASES (continued)

APPLICABILITY

In MODES 1, 2, 3, and 4, the CC System is a normally operating system, which must be manually aligned to perform its post accident safety functions, primarily RCS heat removal, which is achieved by cooling the RHR heat exchanger.

With both units in MODE 5 or 6, the OPERABILITY requirements of the CC System are determined by the systems it supports, specifically, the CC System flow path to the RHR heat exchanger.

ACTIONS

The ACTIONS are modified by a Note indicating that the applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops - MODE 4," must be entered if an inoperable CC component(s) renders an RHR loop inoperable (incapable of removing decay heat). This is an exception to LCO 3.0.6, which directs the Required Actions of LCO 3.4.6 to be taken in addition to the Required Actions of this LCO.

A.1

If one CC heat exchanger is inoperable with both units in MODES 1, 2, 3, or 4, action must be taken to restore the inoperable CC heat exchanger to OPERABLE status. Seven days are provided to restore the inoperable CC heat exchanger. At the end of seven days, both units must be shutdown. In lieu of shutting down both units, however, one unit may be place into at least MODE 5 during the seven day period, which allows Condition A to be exited. However, Condition B is still in effect.

One CC heat exchanger is able to support both redundant flow paths capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump. Therefore one inoperable CC heat exchanger removes only the single passive failure protection redundancy. The remaining CC heat exchanger(s) have the capability of supporting all CC flow paths. The completion time is reasonable, based on the redundant capabilities afforded by OPERABLE CC pumps and flow paths during this time period.

(continued)

BASES (continued)

ACTIONS (continued)

B.1

If one CC heat exchanger is inoperable with only one unit in MODES 1, 2, 3, or 4, then action must be taken to restore the required CC heat exchanger within 30 days. With both units in MODES 1, 2, 3, or 4, both Condition A and Condition B are entered, and Condition A is the controlling clock until one unit is shutdown. When at least one unit is in MODES 5 or 6, Condition B becomes the only applicable Condition. If one unit is defueled, the number of required CC heat exchangers is two, so the Condition will no longer be applicable with only one heat exchanger inoperable.

One CC heat exchanger is able to support both redundant flow paths capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump. Therefore one inoperable CC heat exchanger removes only the single passive failure protection redundancy. The remaining CC heat exchanger(s) have the capability of supporting all CC flow paths. The completion time is reasonable, based on the redundant capabilities afforded by OPERABLE CC pumps and flow paths during this time period.

C.1 and C.2

If one required CC pump, or flow path capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump, is inoperable, action must be taken to restore the required pump or flow paths to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE CC pump and flow path are adequate to provide the required cooling. The 7 day Completion Time is reasonable, based on the redundant capabilities afforded by the OPERABLE pumps and flow path, and the low probability of a DBA occurring during this period.

(continued)

BASES (continued)

ACTIONS (continued)

D.1 and D.2

If one CC pump and one CC flow path capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump, are inoperable, action must be taken to restore the CC pump or the CC flow path to OPERABLE status within 24 hours. In this condition, it is acceptable to continue operation for 24 hours without a redundant CC pump and a redundant flow path. This is because in this condition the remaining OPERABLE CC pumps and flow path are adequate to provide the required cooling, and there is a low probability of a DBA occurring during this period.

E.1 and E.2

If the CC component(s) cannot be restored to OPERABLE status within the associated Completion Time, or if two required CC pumps are inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

SURVEILLANCE REQUIREMENTS

SR 3.7.7.1

This SR verifies proper automatic operation of the CC pumps on an actual or simulated actuation signal (i.e., safety injection, and safe shutdown sequencer by the Loss of Power Diesel Generator Start Instrumentation, LCO 3.3.5). The CC System is a normally operating system that is not typically actuated as part of routine testing during normal operation.

The 18 month Frequency is based on the need to perform this Surveillance under the conditions that apply during a unit outage and the potential for an unplanned transient if the Surveillance were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillance when performed at the 18 month Frequency. Therefore, the Frequency is acceptable from a reliability standpoint.

REFERENCES

1. UFSAR, Section 9.2.2.

CTS MARKUPS

3.5.1 Cond. B

3.8 5. Onc accumulator may be inoperable for one hour.

3.5-33

B. If these conditions cannot be met the reactor shall be brought to the hot shutdown condition within four hours. After a maximum of 48 hours in the hot shutdown condition, if the system is not operable the reactor shall be brought to the cold shutdown condition within 12 hours.

3.5-34

3.5-35 ACTION 'D'

3.5-38

3.7.7

6. Component cooling system

LCO 3.7.7

A. The following number of component cooling water pumps and heat exchangers shall be operable as indicated to bring the reactors from hot shutdown to hot standby:

3.7-68 3.7-12

1. One unit in cold shutdown and one unit from hot shutdown to hot standby:

3 pumps and 2 heat exchangers

3.7-12

2. Two units from hot shutdown to hot standby:

4 pumps and 3 heat exchangers

3. One unit operating and one unit from hot shutdown to hot standby:

4 pumps and 3 heat exchangers

3.7-12

(3.7-68)

4.8 5. A. 4. b. The accumulator isolation valves (1MOV-SI8808A, B, C and D) shall be stroked manually from the control room to check the position indicators and annunciators every refueling outage.

3.5-20

3.5-36

3.5-37

5. Not Applicable.

B. Not Applicable.

3.7.7

6. Component cooling system

A. Surveillance and testi of the component cooling pumps systems shall be performed as follows:

5.5.6

3.7-65

Each component cooling pump shall be tested pursuant to Specification 4.0.5.

3.7-32 Add SR 3.7.7.1 w/ Note

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.7.7	
3.8.6 B. Except as specified in Sections 3.8.6C and 3.8.6D the following numbers of components cooling water pumps and heat exchangers shall be operable when the reactors are in hot standby or operating: (3.7-12) 1. One unit: 3 pumps and 2 heat exchangers 2. Two units: 4 pumps and 3 heat exchangers	4.8.6 B. Not Applicable. (3.7-68)
PA A.1 C. From and after the date that two of the component cooling water pumps are found or made inoperable during 2 unit operation, reactor operation on one unit may proceed indefinitely. Reactor operation is limited to 7 days on the other unit provided that, during those 7 days, the remaining three pumps and the three heat exchangers are operable. (3.7-12)	(3.7-68) C. Not Applicable. 2ND PART COND A & R.A A.2 — (3.7-28)
PA B.1, B.2 D. From and after the date that two of the component cooling water pumps and one of the heat exchangers are found or made inoperable during 2 unit operation, reactor operation on one unit may proceed indefinitely. Reactor operation is limited to 24 hours on the other unit provided that, during those 24 hours, the remaining three pumps and the remaining 2 heat exchangers are operable. (3.7-12)	D. Not Applicable. (3.7-68) (3.7-69)

3.7.7 LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENT
3.8.6 E. If these conditions cannot be met, or if two of the heat exchangers are found or made inoperable, the reactor(s) shall be brought to the hot shutdown condition within 8 hours. After a maximum of 48 hours in this condition, if the minimum requirements cannot be met the reactor(s) shall be brought to the cold shutdown condition in a period consistant with the heat removal capability of the remaining heat exchangers.	4.8.6 E. Not Applicable.

3.7-29

RA C.1/C.2

3.7-30

3.7-36

3.7-31 Add 3.7.7 Action Note

DOC CHANGES

NSHC	NO.	DISCUSSION
M.	65.	In MODES 2 and 3 when inoperable MSIVs are closed and de-activated to comply with Action requirements, an additional action has been provided. This action requires verification that the inoperable MSIVs remain closed and de-activated on a periodic basis. This change provides assurance that the action requirement requiring the inoperable MSIVs to be closed is maintained. The change represents an additional restriction on plant operation.
L-1.	66.	The time specified to transition to MODE 5 with inoperable MSIV(s) has been extended from 30 hours to 36 hours. This extension is consistent with the allowable time specified in LCO 3.0.3 to conduct a cooldown to HOT SHUTDOWN. This change is consistent with NUREG-1431.
A.	67.	The application of the "Specification 3.0.4 not applicable" statement is retained through application of the proposed Specification 3.0.4 since proposed Condition C allows unlimited continued operation.
M.	68.	Two additional Conditions, Required Actions, and Completion Times have been added to the ITS. Because of the requirement to have four CC pumps and three CC heat exchangers OPERABLE with one unit in MODES 1, 2, 3 or 4, and the other unit in MODES 1, 2, 3, 4, 5, or 6, two additional Conditions with associated Required Actions and Completion Times have been added. These Conditions address one inoperable CC heat exchanger with both units in MODES 1, 2, 3 or 4, and one unit in MODES 1, 2, 3 or 4 and the second unit in MODES 5 or 6. Depending on the MODES of the units, these Conditions are provided to cover the situation hwere there are no CC pumps or flow paths inoperable, but a CC heat exchanger is inoperable. As such, this is an additional restriction on plant operation.

NUREG MARKUPS

CTS 3.8.6

3.7 PLANT SYSTEMS

3.7.7 Component Cooling Water (CCW) System

(11) PS design states system

LCO 3.7.7 ~~Two~~ The CCW ~~trains~~ System shall be OPERABLE.

APPLICABILITY: MODES 1, 2, 3, and 4.

ACTIONS

CONDITION	REQUIRED ACTION	COMPLETION TIME
~~A.~~ B D. One required CCW ~~train~~ flow path inoperable.	~~A.1~~ B D ---------NOTE--------- Enter applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops—MODE 4," for residual heat removal loops made inoperable by CCW.	
One required CC pump inoperable. AND		
	OR ~~B.2~~ D Restore CCW ~~train~~ flow path to OPERABLE status.	~~72~~ 24 hours
	Restore required CC pump to OPERABLE status	24 hours
~~B.~~ ~~C~~ E. Required Action and associated Completion Time ~~of Condition A~~ not met. OR Two required CC pumps inoperable.	~~B.1~~ ~~C~~ E Be in MODE 3. AND	6 hours
	~~B.2~~ ~~C~~ E Be in MODE 5.	36 hours
(11) C. One required CC pump inoperable. OR One required CC flow path inoperable	C.1 Restore required CC pump to OPERABLE status. AND	7 days
	C.2 Restore required CC flow path to OPERABLE status	7 days

CTS only reduced capacity; not total loss.

INSERT 3.7-17

CONDITION	REQUIRED ACTION	COMPLETION TIME
A. One required CC heat exchanger inoperable with both units in MODES 1, 2, 3, or 4.	A.1 Restore required CC heat exchanger to OPERABLE status.	7 days
B. One required CC heat exchanger inoperable with one unit in MODES 1, 2, 3, or 4.	B.1 Restore required CC heat exchanger to OPERABLE status	30 days

B 3.7 PLANT SYSTEMS

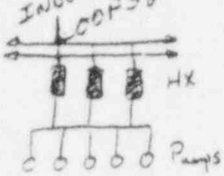
B 3.7.7 Component Cooling Water (CCW) System

BASES

BACKGROUND

The CCW System provides a heat sink for the removal of process and operating heat from safety related components during a Design Basis Accident (DBA) or transient. During normal operation, the CCW System also provides this function for various nonessential components, as well as the spent fuel storage pool. The CCW System serves as a barrier to the release of radioactive byproducts between potentially radioactive systems and the Service Water System, and thus to the environment.

A typical CCW System is arranged as two independent, full capacity cooling loops, and has isolatable nonsafety related components. Each safety related train includes a full capacity pump, surge tank, heat exchanger, piping, valves, and instrumentation. Each safety related train is powered from a separate bus. An open surge tank in the system provides pump trip protective functions to ensure that sufficient net positive suction head is available. The pump in each train is automatically started on receipt of a safety injection signal, and all nonessential components are isolated.



Additional information on the design and operation of the system, along with a list of the components served, is presented in the FSAR, Section [9.2.2] (Ref. 1). The principal safety related function of the CCW System function is the removal of decay heat from the reactor via the Residual Heat Removal (RHR) System. This may be during a normal or post accident cooldown and shutdown.

APPLICABLE SAFETY ANALYSES

The design basis of the CCW System is for one CCW train to remove the post loss of coolant accident (LOCA) heat load from the containment sump during the recirculation phase, with a maximum CCW temperature of [120]°F (Ref. 2). The Emergency Core Cooling System (ECCS) LOCA and containment OPERABILITY LOCA each model the maximum and minimum performance of the CCW System, respectively. The normal temperature of the CCW is [80]°F, and, during unit cooldown to MODE 5 (T_{cold} < [200]°F), a maximum temperature of 95°F is

(continued)

INSERT B36A

The CC System is a shared system which provides a heat sink for the removal of process and operating heat from safety related components during a Design Basis Accident (DBA) or transient. During normal operation, the CC System also provides this function for various nonessential components, as well as the spent fuel storage pool. The CC System serves as a barrier to the release of radioactive byproducts between potentially radioactive systems and the Service Water System, and thus to the environment.

The CC System consists of five CC pumps, three CC heat exchangers, two surge tanks, and associated valves and piping which support the two units. The CC System contains redundant safety-related flow paths. A flow path consists of the piping and valves necessary to provide cooling water to the RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump. To consider a flowpath OPERABLE it must be either aligned or capable of being aligned to its required safety-related loads, and be supported by a CC heat exchanger and a surge tank. Each pump is supplied from a separate emergency diesel generator. The five pumps supply flow to the three heat exchangers via a common header, however each pump or heat exchanger can be isolated from the others without affecting the remaining flow paths. The surge tanks in the system provide assurance that adequate net positive suction head is available.

To support the capability to cool down to MODES 5 or 6 (either normal or post-accident), a single flow path capable of cooling an RHR heat exchanger is required. When a unit is in MODES 5 or 6, the number of required flow paths is dependent on the number of required RHR loops (needed to maintain MODES 5 or 6) per Specification 3.4.7, 3.9.4, or 3.9.5, but is always at least one. When a unit is defueled, there is no requirement for the RHR flow path. The flow demand associated with each Safety Related flow path can be met by one CC pump per flow path. Therefore, a minimum of one flow path (and consequently one CC pump) is required for each unit in MODES 1, 2, 3, 4, 5 or 6.

The CC System also provides cooling to the following loads which are not required for accident mitigation purposes, but may be required for plant operation:

a. Reactor coolant pump motors and thermal barriers,
b. Letdown heat exchanger,
c. Excess letdown heat exchanger,
d. Seal water heat exchanger,
e. Spent fuel pool heat exchanger,
f. RCS sample heat exchangers,
g. Reactor vessel support cooling,
h. Waste gas compressors, and

INSERT B36A
(continued)   i. Failed fuel monitor cooling.

The flow demand associated with these loads can be met by one CC pump and is the equivalent demand of one RHR flow path described above.

Therefore, a total of three CC pumps are required whenever one unit is in MODES 1, 2, 3 or 4, and the other unit is in MODES 1, 2, 3, 4, 5 or 6. A total of two CC pumps are required whenever one unit is in MODES 1, 2, 3 or 4, and the other unit is defueled.

Each CC heat exchanger is sized to handle the equivalent of two flow paths (or the equivalent of two CC pumps).

Therefore, a total of two CC heat exchangers are required whenever one unit is in MODES 1, 2, 3 or 4, and the other unit is in MODES 1, 2, 3, 4, 5 or 6. A total of one CC heat exchanger is required whenever one unit is in MODES 1, 2, 3 or 4, and the other unit is defueled.

The flow path, pump and heat exchanger redundancy requirements are independent of each other. An additional CC pump is required to meet single failure criteria, and an additional CC heat exchanger is required to meet passive single failure protection criteria. Redundancy requirements for RHR flow paths are unit specific, and do not impact CC pump or CC heat exchanger requirements. Additional CC pumps or heat exchangers are required because of potential failures of these components.

When in Modes 1, 2, 3, or 4, a redundant flow path capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump is required to meet single-failure criteria. An additional CC pump is required for single-failure criteria for the CC pumps, and an additional CC heat exchanger is required to meet passive single failure protection criteria for the CC heat exchangers.

Each pump automatically starts upon receipt of a safety injection signal (from its associated unit) or from the safe shutdown sequencer by the Loss of Power Diesel Generator Start Instrumentation, LCO 3.3.5. Three pumps are normally associated with Unit 1 (0CC005-0C, 0CC006-0D, and 0CC007-0E) and two pumps are normally associated with Unit 2 (0CC003-0A, and 0CC004-0B)).

INSERT B36B

to remove the post LOCA heat load from the containment recirculation sump of the affected unit during the recirculation phase, and simultaneously, remove the normal shutdown heat load from the unaffected unit.

BASES

APPLICABLE SAFETY ANALYSES (continued)

~~assumed.~~ ~~This~~ The design prevents the containment recirculation sump fluid from increasing in temperature during the recirculation phase following a LOCA, and provides a gradual reduction in the temperature of this fluid as it is supplied to the Reactor Coolant System (RCS) by the ECCS pumps.

~~The CCW System is designed to perform its function with a single failure of any active component, assuming a loss of offsite power.~~ INSERT B37A — address isolation capability

The CCW System also functions to cool the unit from RHR entry conditions ~~(T_{cold} < [350]°F)~~, to MODE 5 ~~(T_{cold} < [200]°F)~~, during normal and post accident operations. The time required ~~to~~ cool ~~from [350]°F to [200]°F~~ down is a function of the number of CCW and RHR ~~trains~~ components operating. One CCW ~~train is~~ pump and heat exchanger are sufficient to remove decay heat during subsequent operations ~~with T_{cold} < [200]°F~~ in MODES 5 and 6. This assumes a maximum service water temperature ~~of [95]~~ 80 °F occurring simultaneously with the maximum heat loads on the system.

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

LCO

INSERT B37B

~~The CCW trains are independent of each other to the degree that each has separate controls and power supplies and the operation of one does not depend on the other. In the event of a DBA, one CCW train is required to provide the minimum heat removal capability assumed in the safety analysis for the systems to which it supplies cooling water. To ensure this requirement is met, two trains of CCW must be OPERABLE. At least one CCW train will operate assuming the worst case single active failure occurs coincident with a loss of offsite power.~~

~~A CCW train is considered OPERABLE when:~~

~~a. The pump and associated surge tank are OPERABLE; and~~

~~b. The associated piping, valves, heat exchanger, and instrumentation and controls required to perform the safety related function are OPERABLE.~~

~~The isolation of CCW from other components or systems not required for safety may render those components or systems~~

(continued)

INSERT B37A

An OPERABLE CC System provides the required redundancy to ensure that the CC System safety functions can be accomplished assuming either; 1) loss of the onsite electric power system (diesel generators) assuming offsite power is available, or 2) loss of the offsite electric power system assuming onsite power (diesel generators) is available, coincident with a single failure (a passive failure is only assumed during the recirculation phase). Passive failures resulting in a breech of the CC System fluid boundary are assumed to result in a maximum leakage of 50 gallons per minute. Further, redundant components and means of isolation are provided so that the CC System may be separated to serve each unit independently during normal cooldown and following a LOCA.

INSERT B37B

The CC system is normally operated as a shared system that provides cooling to equipment on both units. Therefore, the Modes of both units must be considered for determining the requirements for an OPERABLE CC System.

System operation with the common heat exchanger flow path shared between the two units is acceptable for the CC System. Furthermore, a heat exchanger does not need to be valved in to be considered OPERABLE; manual isolation does not affect OPERABILITY since the component is capable of being aligned and is not required until the recirculation phase of a LOCA. In addition, a surge tank does not need to be valved in to be considered OPERABLE.

For both units in MODES 1, 2, 3, or 4, the CC System is required to be OPERABLE with:

a. Four CC pumps,

b. Three CC heat exchangers,

c. Two redundant flow paths to capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump for each unit in MODES 1, 2, 3, or 4,

d. Two surge tanks, and

e. Associated piping and valves.

INSERT 37B
(continued) For a single unit in MODES 1, 2, 3, or 4, with the second unit in MODES 5, or 6, the CC System is required to be OPERABLE with:

a. Four CC pumps,

b. Three CC heat exchangers,

c. Two redundant flow paths to capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump for each unit in MODES 1, 2, 3, or 4 (NOTE: For the unit that is in MODES 5 or 6, the number of required flow paths is dependent on the number of required RHR loops per specifications 3.4.7, 3.9.4 or 3.9.5.),

d. Two surge tanks, and

e. Associated piping and valves.

For a single unit in MODE 1, 2, 3, or 4, with the second unit in a defueled condition, the CC System is required to be OPERABLE with:

a. Three CC pumps,

b. Two CC heat exchangers,

c. Two redundant flow paths capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump,

d. Two surge tanks, and

e. Associated piping and valves.

The OPERABILITY of each CC pump includes the capability to automatically start upon actuation of the Loss of Power Diesel Generator Start Instrumentation. The OPERABILITY of each CC pump in MODES 1, 2, 3, or 4 also includes the capability to start automatically when required to support the safety injection function. This requires that the diesel generator associated with each OPERABLE CC pump is OPERABLE.

BASES

LCO (continued)

inoperable but does not affect the OPERABILITY of the CCW System.

APPLICABILITY

In MODES 1, 2, 3, and 4, the CCW System is a normally operating system, which must be prepared to perform its post accident safety functions, primarily RCS heat removal, which is achieved by cooling the RHR heat exchanger.

In MODE 5 or 6, the OPERABILITY requirements of the CCW System are determined by the systems it supports.

ACTIONS

A.1

Required Action A.1 is modified by a Note indicating that the applicable Conditions and Required Actions of LCO 3.4.6, "RCS Loops—MODE 4," be entered if an inoperable CCW train results in an inoperable RHR loop. This is an exception to LCO 3.0.6 and ensures the proper actions are taken for these components.

If one CCW train is inoperable, action must be taken to restore OPERABLE status within 72 hours. In this Condition, the remaining OPERABLE CCW train is adequate to perform the heat removal function. The 72 hour Completion Time is reasonable, based on the redundant capabilities afforded by the OPERABLE train, and the low probability of a DBA occurring during this period.

B.1 and B.2

If the CCW train cannot be restored to OPERABLE status within the associated Completion Time, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in at least MODE 3 within 6 hours and in MODE 5 within 36 hours. The allowed Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

(continued)

INSERT B38A

A.1

If one CC heat exchanger is inoperable with both units in MODES 1, 2, 3, or 4, action must be taken to restore the inoperable CC heat exchanger to OPERABLE status. Seven days are provided to restore the inoperable CC heat exchanger. At the end of seven days, both units must be shutdown. In lieu of shutting down both units, however, one unit may be place into at least MODE 5 during the seven day period, which allows Condition A to be exited. However, Condition B is still in effect.

One CC heat exchanger is able to support both redundant flow paths capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump. Therefore one inoperable CC heat exchanger removes only the single passive failure protection redundancy. The remaining CC heat exchanger(s) have the capability of supporting all CC flow paths. The completion time is reasonable, based on the redundant capabilities afforded by OPERABLE CC pumps and flow paths during this time period.

B.1

If one CC heat exchanger is inoperable with only one unit in MODES 1, 2, 3, or 4, then action must be taken to restore the required CC heat exchanger within 30 days. With both units in MODES 1, 2, 3, or 4, both Condition A and Condition B are entered, and Condition A is the controlling clock until one unit is shutdown. When at least one unit is in MODES 5 or 6, Condition B becomes the only applicable Condition. If one unit is defueled, the number of required CC heat exchangers is two, so the Condition will no longer be applicable with only one heat exchanger inoperable.

One CC heat exchanger is able to support both redundant flow paths capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump. Therefore one inoperable CC heat exchanger removes only the single passive failure protection redundancy. The remaining CC heat exchanger(s) have the capability of supporting all CC flow paths. The completion time is reasonable, based on the redundant capabilities afforded by OPERABLE CC pumps and flow paths during this time period.

INSERT B38A (continued)

C.1 and C.2

If one required CC pump or flow path capable of cooling an RHR heat exchanger, an SI pump, a centrifugal charging pump, and an RHR pump is inoperable, action must be taken to restore the required pump or flow path to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE CC pumps and flow path are adequate to provide the required cooling. The 7 day Completion Time is reasonable, based on the redundant capabilities afforded by the OPERABLE pumps and flow path, and the low probability of a DBA occurring during this period.

DOD CHANGES

CHANGE NUMBER — DISCUSSION

34. NUREG LCO 3.7.8; Proposed LCO 3.7.8
A new Condition and Required Action has been added to address the relationship between SW pump operability and SW valve and component alignment to provide for minimum flow requirements under DBA conditions.

If the SW system configuration is not in accordance with the requirement for the current SW pump configuration, this indicates that SW flow may not be sufficient to meet design basis assumptions for the given accident scenarios. While in the Required Action, SW configuration must meet the requirements for SW operation during a DBA with a loss of single failure capability; in this instance seven days is an acceptable time frame to restore SW configuration to normal lineup. Failure to meet the requirements for SW pumps or SW valve and component lineup represents a loss of SW function, which will require an entry into LCO 3.0.3.

35. Proposed New SR 3.7.8.1
A new surveillance requirement has been proposed to perform an SW valve and component lineup verification on a weekly basis. The purpose of the valve and component lineup verification is to ensure that the SW system is aligned correctly to support the most limiting case design basis accident, and still maintain correct SW flow to SW components. Specifically, minimum Reactor Containment Fan Cooler flow of 1500 gpm is required to comply with design assumptions of the containment analysis. SW configuration to meet this requirement is provided by meeting SR 3.7.8.1.

36. The BASES for LCO 3.7.7 have been clarified to address the Component Cooling (CC) System cooling flow requirements. Potential CC flow demands may not be met by the current number of required OPERABLE CC pumps. The CC System consists of five CC pumps, three CC heat exchangers, two RHR heat exchangers per unit, and several miscellaneous safety-related loads. Three CC pumps and two CC heat exchangers are required operable with one unit in MODES 1, 2, 3, or 4, and the other unit in MODES 5 or 6. Actual flow demands on the CC System consists of two RHR heat exchangers and miscellaneous safety-related loads, which require three CC pumps to satisfy. A fourth pump and a third heat exchanger are required in order to meet single failure criteria. With one unit defueled, only one RHR heat exchanger is required, and therefore one less CC pump is required.

37. Two additional Conditions, with associated Required Actions and Completion Times, have been added to LCO 3.7.7. They address the situation where a CC heat exchanger is inoperable. The Completion Times depend on the MODES of both units. The reason for a specific Condition for CC heat exchangers is because CC System OPERABILITY requires three CC heat exchangers (two to handle design CC flow, a third to provide passive single failure protection). Under current ITS, there is no Condition which covers the situation where only a single CC heat exchanger is inoperable.

ATTACHMENT 2

Changes to the BASES for the Operating MODE Electical Limiting Conditions for Operation

MARK UP OF ITS CHANGE

OI B3.8.1 – Clarification of design basis for LOOP

The Applicable Safety Analysis discussion in the BASES for 3.8.1, 3.8.4, 3.8.7 and 3.8.9 needs to be clarified to state that the DBA requiring single-unit LOOP is a unit-specific accident that requires SI to mitigate the consequences.

BASES (continued)

APPLICABLE SAFETY ANALYSES

The initial conditions of DBA and transient analyses in the UFSAR, Chapter 15 (Ref. 3), assume ESF systems are OPERABLE. The AC electrical power sources are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System (RCS), and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC electrical power sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit.

For a Design Basis ~~a~~Accident **that requires Safety Injection to be initiated to mitigate the accident,** this results in maintaining at least two unit-specific divisions, powered from onsite or offsite AC sources, OPERABLE during accident conditions in the event of:

a. An assumed loss of ~~all~~ offsite power ~~or all onsite AC power~~ on the affected unit; and

b. A worst case single failure on the affected unit.

For a dual unit loss of offsite power **without a unit-specific LOCA** this results in maintaining power to the necessary equipment from the onsite AC sources in addition to a worst case single failure on one unit.

The AC sources satisfy Criterion 3 of NRC Policy Statement.

LCO

Two qualified feeds between the offsite transmission network and the onsite Class 1E electrical power distribution divisions, and separate and independent DGs for each division ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an anticipated operational occurrence or a postulated DBA.

(continued)

BASES

BACKGROUND (continued)

The five 125 V DC batteries (111, 112, 011, 211, and 212) are sized to carry the required loads discussed in the UFSAR, Chapter 8 (Ref. 2). The batteries for each division of DC electrical power were originally sized to produce required capacity at 80% of nameplate rating, corresponding to warranted capacity at end of life cycles and the 100% design demand.

Each division of DC electrical power has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger also has sufficient capacity to restore the battery from the design minimum charge to its fully charged state within 24 hours while supplying normal steady state loads discussed in the UFSAR, Chapter 8 (Ref. 2).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 15 (Ref. 3), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit.

For a Design Basis ~~a~~Accident **that requires Safety Injection to be initiated to mitigate the accident,** this results in maintaining at least two DC sources OPERABLE during accident conditions in the event of:

a. An assumed loss of ~~all~~ offsite power ~~or all onsite AC power~~ on the affected unit; and

b. A worst case single failure on the affected unit.

For a dual unit loss of offsite power **without a unit-specific LOCA** this results in maintaining DC power to the necessary equipment, in addition to a worst case single failure on one unit.

(continued)

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Inverters - Operating

BASES

BACKGROUND

The inverters are the preferred source of power for the AC instrument buses because of the stability and reliability they achieve. The function of the inverter is to provide AC electrical power to the instrument buses. The inverters can be powered from one of two sources: a 480 V AC source that is stepped down and rectified to nominal 125 V DC (normally providing power), and an external 125 V DC source ("bumpless" transfer in the event of loss of the normal AC feed). This 125 V DC source ensures an uninterruptable power source for the instrumentation and controls for the Reactor Protection System (RPS) and the Engineered Safety Feature Actuation System (ESFAS). Specific details on inverters and their operating characteristics are found in the UFSAR, Chapter 8 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 15 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the RPS and ESFAS instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and is based on meeting the design basis of the unit. For a Design Basis Accident that requires Safety Injection to be initiated to mitigate the accident, ~~T~~this includes maintaining required AC instrument buses OPERABLE during accident conditions in the event of:

a. An assumed loss of ~~all~~ offsite AC electrical power ~~or all onsite AC electrical power~~ on the affected unit; and

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 15 (Ref. 2), assume ESF systems are OPERABLE. The AC ESF, DC, and AC instrument bus electrical power distribution divisions are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC ESF, DC, and AC instrument bus electrical power distribution divisions is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. For a ~~d~~Design ~~b~~Basis ~~a~~Accident **that requires Safety Injection to be initiated to mitigate the accident,** this includes maintaining power distribution systems OPERABLE during accident conditions in the event of:

a. An assumed loss of ~~all~~ offsite power ~~or all onsite AC electrical power~~ on the affected unit; and

b. A worst case single failure on the affected unit.

For a dual unit loss of offsite power **wihtout a unit-specific LOCA** this results in maintaining power to the necessary equipment in addition to a worst case single failure on one unit.

The distribution systems satisfy Criterion 3 of the NRC Policy Statement.

LCO

The required power distribution divisions listed in the LCO ensure the availability of AC ESF, DC, and AC instrument bus electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. The AC ESF, DC, and AC instrument bus electrical power distribution divisions are required to be OPERABLE.

The necessary portions of the opposite unit AC ESF and DC electrical power distribution division(s) are required to

(continued)

CLEAN ITS SPEC

BASES (continued)

APPLICABLE SAFETY ANALYSES

The initial conditions of DBA and transient analyses in the UFSAR, Chapter 15 (Ref. 3), assume ESF systems are OPERABLE. The AC electrical power sources are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System (RCS), and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC electrical power sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit.

For a Design Basis Accident **that requires Safety Injection to be initiated to mitigate the accident,** this results in maintaining at least two unit-specific divisions, powered from onsite or offsite AC sources, OPERABLE during accident conditions in the event of:

a. An assumed loss of offsite power on the affected unit; and

b. A worst case single failure on the affected unit.

For a dual unit loss of offsite power **without a unit-specific LOCA** this results in maintaining power to the necessary equipment from the onsite AC sources in addition to a worst case single failure on one unit.

The AC sources satisfy Criterion 3 of NRC Policy Statement.

LCO

Two qualified feeds between the offsite transmission network and the onsite Class 1E electrical power distribution divisions, and separate and independent DGs for each division ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an anticipated operational occurrence or a postulated DBA.

(continued)

BASES

BACKGROUND (continued)

The five 125 V DC batteries (111, 112, 011, 211, and 212) are sized to carry the required loads discussed in the UFSAR, Chapter 8 (Ref. 2). The batteries for each division of DC electrical power were originally sized to produce required capacity at 80% of nameplate rating, corresponding to warranted capacity at end of life cycles and the 100% design demand.

Each division of DC electrical power has ample power output capacity for the steady state operation of connected loads required during normal operation, while at the same time maintaining its battery bank fully charged. Each battery charger also has sufficient capacity to restore the battery from the design minimum charge to its fully charged state within 24 hours while supplying normal steady state loads discussed in the UFSAR, Chapter 8 (Ref. 2).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 15 (Ref. 3), assume that Engineered Safety Feature (ESF) systems are OPERABLE. The DC electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit.

For a Design Basis Accident **that requires Safety Injection to be initiated to mitigate the accident,** this results in maintaining at least two DC sources OPERABLE during accident conditions in the event of:

a. An assumed loss of offsite power on the affected unit; and

b. A worst case single failure on the affected unit.

For a dual unit loss of offsite power **without a unit-specific LOCA** this results in maintaining DC power to the necessary equipment, in addition to a worst case single failure on one unit.

(continued)

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Inverters – Operating

BASES

BACKGROUND

The inverters are the preferred source of power for the AC instrument buses because of the stability and reliability they achieve. The function of the inverter is to provide AC electrical power to the instrument buses. The inverters can be powered from one of two sources: a 480 V AC source that is stepped down and rectified to nominal 125 V DC (normally providing power), and an external 125 V DC source ("bumpless" transfer in the event of loss of the normal AC feed). This 125 V DC source ensures an uninterruptable power source for the instrumentation and controls for the Reactor Protection System (RPS) and the Engineered Safety Feature Actuation System (ESFAS). Specific details on inverters and their operating characteristics are found in the UFSAR, Chapter 8 (Ref. 1).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 15 (Ref. 2), assume Engineered Safety Feature systems are OPERABLE. The inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the RPS and ESFAS instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and is based on meeting the design basis of the unit. **For a Design Basis Accident that requires Safety Injection to be initiated to mitigate the accident,** this includes maintaining required AC instrument buses OPERABLE during accident conditions in the event of:

a. An assumed loss of offsite AC electrical power on the affected unit; and

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the UFSAR, Chapter 15 (Ref. 2), assume ESF systems are OPERABLE. The AC ESF, DC, and AC instrument bus electrical power distribution divisions are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC ESF, DC, and AC instrument bus electrical power distribution divisions is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. For a Design Basis Accident **that requires Safety Injection to be initiated to mitigate the accident,** this includes maintaining power distribution systems OPERABLE during accident conditions in the event of:

a. An assumed loss of offsite power on the affected unit; and

b. A worst case single failure on the affected unit.

For a dual unit loss of offsite power **without a unit-specific LOCA** this results in maintaining power to the necessary equipment in addition to a worst case single failure on one unit.

The distribution systems satisfy Criterion 3 of the NRC Policy Statement.

LCO

The required power distribution divisions listed in the LCO ensure the availability of AC ESF, DC, and AC instrument bus electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence or a postulated DBA. The AC ESF, DC, and AC instrument bus electrical power distribution divisions are required to be OPERABLE.

(continued)

NUREG MARKUPS

BASES

APPLICABLE SAFETY ANALYSES (continued)

exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC electrical power sources is consistent with the initial assumptions of the Accident analyses and is based upon meeting the design basis of the unit. This results in maintaining at least one train of the onsite or offsite AC sources OPERABLE during Accident conditions in the event of:

a. An assumed loss of all offsite power or all onsite AC power; and

b. A worst case single failure.

The AC sources satisfy Criterion 3 of NRC Policy Statement.

LCO

Two qualified circuits between the offsite transmission network and the onsite Class 1E Electrical Power System and separate and independent DGs for each train ensure availability of the required power to shut down the reactor and maintain it in a safe shutdown condition after an anticipated operational occurrence (AOO) or a postulated DBA.

Qualified offsite circuits are those that are described in the FSAR and are part of the licensing basis for the unit.

In addition, one required automatic load sequencer per train must be OPERABLE.

Each offsite circuit must be capable of maintaining rated frequency and voltage, and accepting required loads during an accident, while connected to the ESF buses.

Offsite circuit #1 consists of Safeguards Transformer B, which is supplied from Switchyard Bus B, and is fed through breaker 52-3 powering the ESF transformer XNB01, which, in turn, powers the #1 ESF bus through its normal feeder breaker. Offsite circuit #2 consists of the Startup Transformer, which is normally fed from the Switchyard

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

electrical power system provides normal and emergency DC electrical power for the DGs, emergency auxiliaries, and control and switching during all MODES of operation.

The OPERABILITY of the DC sources is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining the DC sources OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite AC power or all onsite AC power; and

b. A worst case single failure.

The DC sources satisfy Criterion 3 of the NRC Policy Statement.

LCO

The DC electrical power subsystems, each subsystem consisting of [two] batteries, battery charger [for each battery] and the corresponding control equipment and interconnecting cabling within the train are required to be OPERABLE to ensure the availability of the required power to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. Loss of any train DC electrical power subsystem does not prevent the minimum safety function from being performed (Ref. 4).

An OPERABLE DC electrical power subsystem requires all required batteries and respective chargers to be operating and connected to the associated DC bus(es).

APPLICABILITY

The DC electrical power sources are required to be OPERABLE in MODES 1, 2, 3, and 4 to ensure safe unit operation and to ensure that:

a. Acceptable fuel design limits and reactor coolant pressure boundary limits are not exceeded as a result of AOOs or abnormal transients; and

(continued)

B 3.8 ELECTRICAL POWER SYSTEMS

B 3.8.7 Inverters—Operating

BASES

BACKGROUND

The inverters are the preferred source of power for the AC vital buses because of the stability and reliability they achieve. in being powered from the 120 VDC battery source. The function of the inverter is to convert DC electrical power to AC electrical power, thus providing an uninterruptible power source for the instrumentation and controls for the Reactor Protective System (RPS) and the Engineered Safety Feature Actuation System (ESFAS). Specific details on inverters and their operating characteristics are found in the FSAR, Chapter [8] (Ref. 1).

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter [6] (Ref. 2) and Chapter [15] (Ref. 3), assume Engineered Safety Feature systems are OPERABLE. The DC to AC inverters are designed to provide the required capacity, capability, redundancy, and reliability to ensure the availability of necessary power to the RPS and ESFAS instrumentation and controls so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the inverters is consistent with the initial assumptions of the accident analyses and is based on meeting the design basis of the unit. This includes maintaining required AC vital buses OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite AC electrical power or all onsite AC electrical power; and

b. A worst case single failure.

Inverters are a part of the distribution system, and as such, satisfy Criterion 3 of the NRC Policy Statement.

(continued)

BASES (continued)

APPLICABLE SAFETY ANALYSES

The initial conditions of Design Basis Accident (DBA) and transient analyses in the FSAR, Chapter [6] (Ref. 1), and in the FSAR, Chapter [15] (Ref. 2), assume ESF systems are OPERABLE. The AC, DC, and AC vital bus electrical power distribution systems are designed to provide sufficient capacity, capability, redundancy, and reliability to ensure the availability of necessary power to ESF systems so that the fuel, Reactor Coolant System, and containment design limits are not exceeded. These limits are discussed in more detail in the Bases for Section 3.2, Power Distribution Limits; Section 3.4, Reactor Coolant System (RCS); and Section 3.6, Containment Systems.

The OPERABILITY of the AC, DC, and AC vital bus electrical power distribution systems is consistent with the initial assumptions of the accident analyses and is based upon meeting the design basis of the unit. This includes maintaining power distribution systems OPERABLE during accident conditions in the event of:

a. An assumed loss of all offsite power or all onsite AC electrical power; and

b. A worst case single failure.

The distribution systems satisfy Criterion 3 of the NRC Policy Statement.

LCO

The required power distribution subsystems listed in Table B 3.8.9-1 ensure the availability of AC, DC, and AC vital bus electrical power for the systems required to shut down the reactor and maintain it in a safe condition after an anticipated operational occurrence (AOO) or a postulated DBA. The AC, DC, and AC vital bus electrical power distribution subsystems are required to be OPERABLE.

Maintaining the Train A and Train B AC, DC, and AC vital bus electrical power distribution subsystems OPERABLE ensures that the redundancy incorporated into the design of ESF is not defeated. Therefore, a single failure within any system or within the electrical power distribution subsystems will not prevent safe shutdown of the reactor.

(continued)

DOD CHANGES

CHANGE NUMBER | DISCUSSION

associated battery. This is because the voltage level of the low voltage equalizing charge will not damage the inverters.

42. NUREG SR 3.8.7.1 & SR 3.8.8.1 - The requirement to check inverter frequency every 7 days has not been included in proposed SR 3.8.7.1 and SR 3.8.8.1 since the design of the inverters does not include installed instrumentation to monitor frequency.

43. Each of the Class 1E AC electrical power distribution divisions is capable of being supplied by a diesel generator. NUREG 1431, LCO 3.8.10 requires the buses necessary to support required equipment to be operable in a shutdown mode. In turn LCO 3.8.2 then requires one diesel generator capable of supplying one of the buses required by LCO 3.8.10. By design Zion Station has shared systems which are powered from the opposite unit's buses. For some evolutions (e.g. handling of irradiated fuel in the fuel handling building) the required equipment may consist of systems and components powered from the opposite unit. In these cases, it would be appropriate for the opposite unit diesels to be required.

44. LCOs 3.8.1, 3.8.4, and 3.8.9 have been modified to require standby AC and DC power (diesel generators and DC) for an opposite unit service water pump when credited for an operating unit. The proposed Service Water LCO (3.7.8) will require at least one service water pump from the opposite unit to be operable to address passive failure considerations. Further, LCO 3.7.8 may require more than one opposite unit pump based on system configuration. Current Technical Specification LCO 3.8.7 requires three service water pumps to be operable, and allows one pump from the opposite unit to be shared as long as specific provisions (i.e. cross-tie valves, open, independent AC and DC power) are met and the pump has both standby AC and DC power available. In the current Technical Specifications this is an option, with the ultimate requirement to have three pumps operable. Based on the incorporation of passive failure considerations and recent system flow performance capability modeling, it has been determined that utilization of an opposite unit pump is no longer an option, but is required for system operability. As such, LCOs 3.8.1, 3.8.4, and 3.8.9 have been modified to require AC and DC power for opposite unit service water pumps in order to maintain continuity with the ITS usage rules and

CHANGE NUMBER — DISCUSSION

44. (continued)

definition of operability. LCOs 3.8.1, 3.8.4, and 3.8.9 will require the AC and DC buses associated with required pumps and their associated diesel generators to be operable. Explicitly requiring these opposite unit systems (at least one diesel, DC source, and associated distribution systems) to be operable anytime the unit is in Modes 1, 2, 3, or 4 is an added restriction on plant operation not contained in the current Technical Specifications. For LCO 3.8.1, 3.8.4, 3.8.7 and 3.8.9, the Applicable Safety Analysis discussion has been clarified to include the correct design basis assumptions for Zion, which is a LOCA on a single unit (requiring SI to be initiated to mitigate the accident), coincident with a LOOP on the affected unit.

45. The modified completion time clock associated with Conditions A, C, and D have been specified as being applicable to the offsite feeds, common diesel generator, and unit-specific diesel generators. This change is necessary based on the proposed completion time for opposite unit diesel generators being 14 days. As such, the modified completion time cap of 10 days must be exempted from other inoperabilities so that an immediate shutdown will not result for conditions which otherwise would be supportive of a limited restoration time. Similarly, proposed Conditions F and G have been rewritten to be applied to only the unit specific and common diesel generators. This is necessary to limit the application of short duration compensatory actions requiring restoration of equipment based on the inability to cope with a design basis event with or without offsite power.

46. Condition H has been added for an inoperable opposite unit diesel generator. This condition is necessary based on the need to maintain at least one opposite unit service water pump operable in order to cope with postulated active and passive failures within the service water system. Proposed LCO 3.8.9 requires the necessary portions of the AC and DC distribution systems to be operable to support this function, while proposed LCO 3.8.1 will require a diesel generator in support of each required service water pump. As such, in keeping with the philosophy of maintaining Condition and Required Action for all required equipment, Condition H has been proposed for opposite unit diesel generators. This is a new condition, and as such is a more restrictive change.

Condition H would allow the opposite unit DG that is required to support at least one opposite unit service water pump to be out of service for 14 days. It is acceptable for the opposite unit DG to be out of service for this period of time since there is no loss of function for the SW system with only the required opposite unit DG out of service. In addition, 14 days provides operational flexibility to perform preventative maintenance on the DG without the need for a dual unit shutdown.

ATTACHMENT 3

Changes to the Fuel Handling Building Exhaust Filtration System Limiting Conditions of Operation and BASES

MARK UP OF ITS CHANGE

OI 3.7.13 - FHBEFS discussion on "post-accident mode of operation"

The LCO and BASES for 3.7.13 need clarification that the required mode of FHBEFS operation is the post-accident mode of operation. An additional SR has been added to verify FHBEFS will be OPERABLE during the period of time the Shield Wall is not intact.

3.7 PLANT SYSTEMS

3.7.13 Fuel Handling Building Exhaust Filter System (FHBEFS)

LCO 3.7.13 The FHBEFS shall be OPERABLE. In addition, the FHBEFS shall be in the post-accident mode of operation during:

a. Movement of irradiated fuel assemblies in the fuel handling building when irradiated fuel assemblies with < 60 days decay time are in the fuel handling building,

b. Movement of irradiated fuel assemblies in containment when irradiated fuel assemblies with < 60 days decay time are in containment and the equipment hatch is not intact,

c. CORE ALTERATIONS with the equipment hatch not intact.

APPLICABILITY: During movement of irradiated fuel assemblies in the fuel handling building,
During movement of irradiated fuel assemblies in containment with the equipment hatch not intact,
During CORE ALTERATIONS with the equipment hatch not intact.

ACTIONS

------------------------------------NOTE------------------------------------
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Required FHBEFS not in the post-accident mode of operation.	A.1	Place FHBEFS in the post-accident mode of operation.	Immediately
	<u>OR</u>		
	A.2	Declare FHBEFS inoperable.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. FHBEFS inoperable during movement of irradiated fuel assemblies in the fuel handling building.	B.1	Suspend movement of irradiated fuel assemblies in the fuel handling building.	Immediately
C. FHBEFS inoperable during movement of irradiated fuel assemblies in the containment with the equipment hatch not intact.	C.1	Suspend movement of irradiated fuel assemblies in containment.	Immediately
D. FHBEFS inoperable during CORE ALTERATIONS with the equipment hatch not intact.	D.1	Suspend CORE ALTERATIONS.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.13.1	--------------------NOTE---------------- Only required: (a) during movement of irradiated fuel assemblies in the fuel handling building when irradiated fuel assemblies with < 60 days decay time are in the fuel handling building; (b) during movement of irradiated fuel assemblies in the containment when irradiated fuel assemblies with < 60 days decay time are in containment and the equipment hatch is not intact; and (c) during CORE ALTERATIONS with the equipment hatch not intact. --- Verify FHBEFS is in the post-accident mode of operation.	12 hours
SR 3.7.13.2	------------------NOTE------------------ Not required with the Containment Shield Wall installed. --- Verify FHBEFS is OPERABLE by ensuring no ventilation flow path exists from the Containment and Fuel Handling Building into the Pipe Tunnel.	7 days
SR 3.7.13.~~2~~3	Operate FHBEFS in the post-accident mode of operation for ≥ 15 minutes.	31 days
SR 3.7.13.~~3~~4	Perform required FHBEFS filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.13.45	--------------------NOTE-------------------- Not required when FHBEFS is in the post-accident mode of operation. -- Verify FHBEFS actuates **in the post-accident mode of operation** on an actual or simulated actuation signal.	18 months
SR 3.7.13.56	Verify FHBEFS can maintain a pressure $\leq$ -0.25 inches water gauge with respect to atmospheric pressure during the post-accident mode of operation at a flow rate $\leq$ 24,000 cfm.	18 months

B 3.7 PLANT SYSTEMS

B 3.7.13 Fuel Handling Building Exhaust Filter System (FHBEFS)

BASES

BACKGROUND

The FHBEFS is a shared system which filters airborne radioactive particulates from the area of the fuel pool following a fuel handling accident in the fuel handling building and from the containment following a fuel handling accident in containment with the equipment hatch not intact. The FHBEFS is a subsystem of the normally operating Auxiliary Building Ventilation System which provides environmental control of temperature and humidity in the auxiliary building and the fuel handling building, including the fuel pool area, ECCS and CS cubicles, and pipe tunnels. The FHBEFS is shared by the two units. The receipt of a high radiation signal initiates the post-accident mode of operation which includes; initiation of the FHBEFS, and isolation of the Fuel Handling Building (FHB) supply by closing the supply damper to the FHB. The supply damper to the FHB is open only when the FHBEFS ventilation system is in the normal mode of operation.

The FHBEFS consists of one train with two parallel paths each containing a prefilter, a high efficiency particulate air (HEPA) filter, and an activated charcoal adsorber section for removal of gaseous activity (principally iodines). Four charcoal booster fans are installed, but one is sufficient to provide the FHBEFS flow requirement in conjunction with two main exhaust fans (six of these are installed). Ductwork, dampers, and instrumentation (automatic initiation is provided for one fan only) also form part of the system. The FHBEFS is placed in the post-accident mode of operation during movement of fuel which has been recently removed from the reactor and during CORE ALTERATIONS with the containment equipment hatch not intact. In order for the FHBEFS to function correctly in the post-accident mode of operation with the Containment Shield Wall removed, a ventilation ductwork spool piece must be installed. This spool piece is installed in the Pipe Tunnel Ventilation System from damper OPDV-AV172 to the top of the Unit 1 vertical pipe chase or from damper OPDV-AV173 to the top of the Unit 2 vertical pipe chase. The system also initiates filtered ventilation in the post-accident mode of operation following receipt of a high radiation signal.

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The FHBEFS is a standby system, parts of which are also utilized by other emergency filtration systems (LCO 3.7.11, "Pipe Tunnel Exhaust Filter System," and LCO 3.7.12, "Emergency Core Cooling System and Containment Spray Cubicle Exhaust Filter System"). ~~The FHBEFS may also be operated during normal plant operations during which the supply air damper to the FHB is open.~~ Upon receipt of an actuation signal, the post-accident mode of operation is initiated. The FHBEFS is discussed in the UFSAR, Sections 9.4.3 and 15.7.4 (Refs. 1 and 2, respectively).

APPLICABLE SAFETY ANALYSES

The FHBEFS design basis is established by the consequences of the limiting Design Basis Accident (DBA), which is a fuel handling accident. The analysis of the fuel handling accident in the fuel handling building, given in Reference 2, assumes that all fuel rods in an assembly are damaged. The DBA analysis of the fuel handling accident assumes that the FHBEFS is functional (in the post-accident mode of operation and maintaining a pressure of $\leq$-.25" water gauge with respect to atmospheric pressure). The accident analysis accounts for the reduction in airborne radioactive material provided by this filtration system. The amount of fission products available for release from the fuel handling building is determined for a fuel handling accident. These assumptions and the analysis follow the guidance provided in Regulatory Guide 1.25 (Ref. 3).

The FHBEFS is also assumed to provide filtration for fuel handling accidents inside containment if the equipment hatch is not intact and the Containment Shield Wall is removed during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment. The most severe radiological consequences result from a fuel handling accident in the containment that involves damage to irradiated fuel (Ref. 2). Fuel handling accidents, analyzed in Reference 3, include dropping a single irradiated fuel assembly and handling tool or a heavy object onto other irradiated fuel assemblies. The requirements of LCO 3.9.3, "Containment Penetrations," LCO 3.9.6, "Refueling Cavity Water Level," and the minimum decay time of 100 hours prior to CORE ALTERATIONS ensure that the release of fission product radioactivity, subsequent to a fuel handling accident in the containment, results in doses that are well below the guideline values specified in 10 CFR 100.

The FHBEFS satisfies Criterion 3 of the NRC Policy Statement.

(continued)

BASES (continued)

LCO

The FHBEFS is required to be OPERABLE to provide filtration of contamination following a fuel handling accident. In addition, the FHBEFS is required to be in the post-accident mode of operation to: 1) assure immediate availability of filtration during movement of irradiated fuel assemblies in the fuel handling building when irradiated fuel assemblies with < 60 days of decay time are in the fuel handling building; 2) during movement of irradiated fuel assemblies in the containment when irradiated fuel assemblies with < 60 days decay time are in the containment and the containment hatch is not intact; and 3) during CORE ALTERATIONS with the equipment hatch not intact. Total system failure could result in the atmospheric release from the fuel handling building exceeding the 10 CFR 100 (Ref. 4) guidelines in the event of a fuel handling accident.

The FHBEFS is considered OPERABLE when the individual components necessary to control radioactive releases are OPERABLE. This system is shared by the two units. The FHBEFS is considered OPERABLE when:

a. Any two main exhaust fans are OPERABLE (both of these may be shared by other required ventilation systems);

b. One charcoal booster fan is OPERABLE, and either operating or capable of automatic actuation (this fan may be shared with PTEFS);

c. HEPA filter and charcoal adsorber are not excessively restricting flow, and are capable of performing their filtration function as determined by the Ventilation Filter Testing Program (VFTP); and

d. Ductwork and dampers are OPERABLE, and air circulation can be maintained.

e. The FHBEFS can maintain a pressure of ≤-.25" water gauge with respect to atmospheric pressure during the post-accident mode of operation.

f. No ventilation flow path exists from the Containment and Fuel Handling Building into the Pipe Tunnel.

g. With the equipment hatch not intact, the Containment

(continued)

Shield Wall must be removed in order for the FHBEFS to function correctly in the post-accident mode of operation.

Equipment normally associated with either unit may fulfill the required functions. However, if the opposite-unit equipment is credited, all opposite-unit support equipment necessary to maintain OPERABILITY must also be OPERABLE.

(continued)

BASES

APPLICABILITY

During movement of irradiated fuel in the fuel handling area, during movement of irradiated fuel in the containment with the equipment hatch not intact, and during CORE ALTERATIONS with the equipment hatch not intact, the FHBEFS is required to be OPERABLE to alleviate the consequences of a fuel handling accident. In addition, the FHBEFS is required to be in the post-accident mode of operation when there is potential for damage to irradiated fuel assemblies with < 60 days of decay time to assure immediate availability of filtration following a fuel handling accident. The equipment hatch is considered to be "intact" when held in place by at least four bolts and at least one personnel air lock door is closed.

ACTIONS

The ACTIONS are modified by a Note indicating that LCO 3.0.3 does not apply. The inoperability of the FHBEFS does not impact the safe operation of the plant, nor the analyzed response to operational events. Therefore, an inoperable FHBEFS is not sufficient reason to require a reactor shutdown.

A.1 and A.2

With the FHBEFS not in the post-accident mode of operation when ~~it is~~ required ~~to be in operation~~ (i.e., during movement of irradiated fuel assemblies in the fuel handling building when irradiated fuel assemblies with < 60 days of decay time are in the fuel handling building, during movement of irradiated fuel assemblies in the containment when irradiated fuel assemblies with < 60 days decay time are in the containment and the equipment hatch is not intact, and during CORE ALTERATIONS with the equipment hatch not intact), action must be taken to immediately place the FHBEFS in the post-accident mode of operation. If the FHBEFS can not be placed in the post-accident mode operation, then the system must be immediately declared inoperable.

(continued)

BASES (continued)

ACTIONS (continued)

B.1, C.1, and D.1

With the FHBEFS inoperable, action must be taken to suspend movement of irradiated fuel assemblies in the fuel handling building, and if the equipment hatch is not intact, action must also be taken to suspend movement of irradiated fuel assemblies in the containment and suspend CORE ALTERATIONS. These actions preclude a fuel handling accident that may result in an unfiltered release. This does not preclude the movement of fuel assemblies to a safe position.

SURVEILLANCE REQUIREMENTS

SR 3.7.13.1

Periodic verification of ~~this~~ the required post-accident mode of operation of the FHBEFS assures immediate availability of filtration following a fuel handling accident. This SR is only required during movement of irradiated fuel assemblies in the fuel handling building when irradiated fuel assemblies with < 60 days of decay time are in the fuel handling building, during movement of irradiated fuel assemblies in the containment when irradiated fuel assemblies with < 60 days decay time are in the containment and the equipment hatch is not intact, and during CORE ALTERATIONS with the equipment hatch not intact. A 12 hour Frequency is sufficient, considering the system indications and alarms available to the operator for monitoring the FHBEFS in the control room.

SR 3.7.13.2

This SR verifies FHBEFS is OPERABLE by verifying there is no ventilation flow path from the Containment or Fuel Handling Building to the Pipe Tunnel. This verification consists of ensuring that the ventilation ductwork spool piece has been installed in the Pipe Tunnel to Auxiliary Building ventilation ductwork. Installation of this spool piece ensures by design measure that radioactive releases as a result of a Fuel Handling Accident inside containment when the Containment Shield Wall is not installed and the Equipment Hatch is removed, or radioactive releases as a result of a Fuel Handling Accident in the Fuel Handling Building when the Containment Shield Wall is not installed are routed through the Auxiliary Building Charcoal Filtration Units.

(continued)

SURVEILLANCE REQUIREMENTS

SR 3.7.13.2 (continued)

This Surveillance is modified by a NOTE that requires the Surveillance when the Containment Shield Wall is not installed. When the FHBEFS is required to be OPERABLE or is required to be in operation, in order for the FHBEFS to function correctly in the post-accident mode of operation with the Containment Shield Wall removed, the ventilation spool piece must be installed in the Auxiliary Building to Pipe Tunnel ventilation ductwork. This is because with the Containment Shield Wall removed and the equipment hatch removed, a potential ventilation flow path exists from the containment into the pipe tunnel unless the Auxiliary Building to Pipe Tunnel ventilation spool piece is installed. Also, if the Containment Shield Wall is not installed when handling irradiated fuel in the fuel handling building, a potential ventilation flow path exists from the fuel handling building into the pipe tunnel unless the ventilation ductwork spool piece is installed.

Seven days was chosen as an appropriate period of time based upon the need to ensure installation of the ventilation spool piece within a reasonable period of time prior to moving irradiated fuel in the fuel handling building, moving irradiated fuel in the containment with the equipment hatch not intact, or performing CORE ALTERATIONS with the equipment hatch not intact. Correct ventilation alignment is verified during the time when the FHBEFS is required to be OPERABLE or in operation, and the Containment Shield Wall is not installed.

SR 3.7.13.~~2~~3

Standby systems should be checked periodically to ensure that they function properly. As the environmental and normal operating conditions on this system are not severe, testing the system once every 31 days provides an adequate check on this system. The system has no heaters and therefore, need only be operated for ≥ 15 minutes to demonstrate the function of the system. The 31 day Frequency is based on the known reliability of the equipment and the redundancy available.

(continued)

BASES

and the redundancy available.

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.13.~~3~~4

This SR verifies that the required FHBEFS testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The FHBEFS filter tests are in general conformance with ANSI N510-1975 (Ref. 5).

The VFTP includes testing HEPA filter performance, charcoal adsorber efficiency, and the physical properties of the activated charcoal. Specific test frequencies and additional information are discussed in detail in the VFTP.

SR 3.7.13.~~4~~5

This SR verifies that the FHBEFS starts and the supply damper closes on an actual or simulated actuation signal. Actuation signals are identified in LCO 3.3.8, "FHBEFS Actuation Instrumentation." Automatic actuation is not required when the system is operating in the post-accident mode of operation, hence, this SR is not required if the system is operating in the post-accident mode. The 18 month Frequency is consistent with Reference 6.

SURVEILLANCE REQUIREMENTS

SR 3.7.13.~~5~~6

This SR verifies the integrity of the fuel handling building enclosure. The ability of the fuel handling building to maintain negative pressure with respect to potentially uncontaminated adjacent areas is periodically tested to verify proper function of the FHBEFS. ~~The FHBEFS is designed to maintain a slight negative pressure in the fuel handling building relative to atmosphere, to prevent unfiltered leakage.~~ The FHBEFS in the post-accident mode is designed to maintain a ≤ -0.25 inches water gauge with respect to atmospheric pressure at a flow rate of ≤ 24,000 cfm from the fuel handling building. The Frequency of 18 months is consistent with the guidance provided in NUREG-0800 (Ref. 7).

(continued)

BASES

REFERENCES

1. UFSAR, Section 9.4.3.

2. UFSAR, Section 15.7.4.

3. Regulatory Guide 1.25, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors," Rev. 0.

4. 10 CFR 100, "Reactor Site Criteria."

5. ANSI N510, "Testing of Nuclear Air-Cleaning Systems," 1975.

6. Regulatory Guide 1.52, "Design, Testing, and Maintenance Criteria for Post-Accident Engineered Safety Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light Water Cooled Nuclear Power Plants," Rev. 2.

7. NUREG-0800, Section 6.5.1, Rev. 2, July 1981.

CLEAN ITS SPEC

3.7 PLANT SYSTEMS

3.7.13 Fuel Handling Building Exhaust Filter System (FHBEFS)

LCO 3.7.13 The FHBEFS shall be OPERABLE. In addition, the FHBEFS shall be in the post-accident mode of operation during:

a. Movement of irradiated fuel assemblies in the fuel handling building when irradiated fuel assemblies with < 60 days decay time are in the fuel handling building,

b. Movement of irradiated fuel assemblies in containment when irradiated fuel assemblies with < 60 days decay time are in containment and the equipment hatch is not intact,

c. CORE ALTERATIONS with the equipment hatch not intact.

APPLICABILITY: During movement of irradiated fuel assemblies in the fuel handling building,
During movement of irradiated fuel assemblies in containment with the equipment hatch not intact,
During CORE ALTERATIONS with the equipment hatch not intact.

ACTIONS

-----------------------------------NOTE-----------------------------------
LCO 3.0.3 is not applicable.

CONDITION	REQUIRED ACTION		COMPLETION TIME
A. Required FHBEFS not in the post-accident mode of operation.	A.1	Place FHBEFS in the post-accident mode of operation.	Immediately
	OR		
	A.2	Declare FHBEFS inoperable.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION		COMPLETION TIME
B. FHBEFS inoperable during movement of irradiated fuel assemblies in the fuel handling building.	B.1	Suspend movement of irradiated fuel assemblies in the fuel handling building.	Immediately
C. FHBEFS inoperable during movement of irradiated fuel assemblies in the containment with the equipment hatch not intact.	C.1	Suspend movement of irradiated fuel assemblies in containment.	Immediately
D. FHBEFS inoperable during CORE ALTERATIONS with the equipment hatch not intact.	D.1	Suspend CORE ALTERATIONS.	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.7.13.1	-------------------NOTE------------------- Only required: (a) during movement of irradiated fuel assemblies in the fuel handling building when irradiated fuel assemblies with < 60 days decay time are in the fuel handling building; (b) during movement of irradiated fuel assemblies in the containment when irradiated fuel assemblies with < 60 days decay time are in containment and the equipment hatch is not intact; and (c) during CORE ALTERATIONS with the equipment hatch not intact. --- Verify FHBEFS is in the post-accident mode of operation.	12 hours
SR 3.7.13.2	-------------------NOTE------------------- Not required with Containment Shield Wall installed. --- Verify FHBEFS is OPERABLE by ensuring no ventilation flow path exists from the Containment and Fuel Handling Building into the Pipe Tunnel.	7 days
SR 3.7.13.3	Operate FHBEFS in the post-accident mode of operation for ≥ 15 minutes.	31 days
SR 3.7.13.4	Perform required FHBEFS filter testing in accordance with the Ventilation Filter Testing Program (VFTP).	In accordance with the VFTP

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.13.5	------------------NOTE------------------ Not required when FHBEFS is in the post-accident mode of operation. -- Verify FHBEFS actuates in the post-accident mode of operation on an actual or simulated actuation signal.	18 months
SR 3.7.13.6	Verify FHBEFS can maintain a pressure ≤ -0.25 inches water gauge with respect to atmospheric pressure during the post-accident mode of operation at a flow rate ≤ 24,000 cfm.	18 months

B 3.7 PLANT SYSTEMS

B 3.7.13 Fuel Handling Building Exhaust Filter System (FHBEFS)

BASES

BACKGROUND

The FHBEFS is a shared system which filters airborne radioactive particulates from the area of the fuel pool following a fuel handling accident in the fuel handling building and from the containment following a fuel handling accident in containment with the equipment hatch not intact. The FHBEFS is a subsystem of the normally operating Auxiliary Building Ventilation System which provides environmental control of temperature and humidity in the auxiliary building and the fuel handling building, including the fuel pool area, ECCS and CS cubicles, and pipe tunnels. The FHBEFS is shared by the two units. The receipt of a high radiation signal initiates the post-accident mode of operation which includes; initiation of the FHBEFS, and isolation of the Fuel Handling Building (FHB) supply by closing the supply damper to the FHB. **The supply damper to the FHB is open only when the FHBEFS ventilation system is in the normal mode of operation.**

The FHBEFS consists of one train with two parallel paths each containing a prefilter, a high efficiency particulate air (HEPA) filter, and an activated charcoal adsorber section for removal of gaseous activity (principally iodines). Four charcoal booster fans are installed, but one is sufficient to provide the FHBEFS flow requirement in conjunction with two main exhaust fans (six of these are installed). Ductwork, dampers, and instrumentation (automatic initiation is provided for one fan only) also form part of the system. The FHBEFS is placed in **the post-accident mode of** operation during movement of fuel which has been recently removed from the reactor and during CORE ALTERATIONS with the containment equipment hatch not intact. **In order for the FHBEFS to function correctly in the post-accident mode of operation with the Containment Shield Wall removed, a ventilation ductwork spool piece must be installed. This spool piece is installed in the Pipe Tunnel Ventilation System from damper OPDV-AV172 to the top of the Unit 1 vertical pipe chase or from damper OPDV-AV173 to the top of the Unit 2 vertical pipe chase.** The system also initiates filtered ventilation **in the post-accident mode of operation** following receipt of a high radiation signal.

(continued)

BASES

BACKGROUND (continued

The FHBEFS is a standby system, parts of which are also utilized by other emergency filtration systems (LCO 3.7.11, "Pipe Tunnel Exhaust Filter System," and LCO 3.7.12, "Emergency Core Cooling System and Containment Spray Cubicle Exhaust Filter System"). Upon receipt of an actuation signal, the post-accident mode of operation is initiated. The FHBEFS is discussed in the UFSAR, Sections 9.4.3 and 15.7.4 (Refs. 1 and 2, respectively).

APPLICABLE SAFETY ANALYSES

The FHBEFS design basis is established by the consequences of the limiting Design Basis Accident (DBA), which is a fuel handling accident. The analysis of the fuel handling accident in the fuel handling building, given in Reference 2, assumes that all fuel rods in an assembly are damaged. The DBA analysis of the fuel handling accident assumes that the FHBEFS is functional **(in the post-accident mode of operation and maintaining a pressure of ≤-.25" water gauge with respect to atmospheric pressure)**. The accident analysis accounts for the reduction in airborne radioactive material provided by this filtration system. The amount of fission products available for release from the fuel handling building is determined for a fuel handling accident. These assumptions and the analysis follow the guidance provided in Regulatory Guide 1.25 (Ref. 3).

The FHBEFS is also assumed to provide filtration for fuel handling accidents inside containment if the equipment hatch is not intact **and the Containment Shield Wall is removed** during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment. The most severe radiological consequences result from a fuel handling accident in the containment that involves damage to irradiated fuel (Ref. 2). Fuel handling accidents, analyzed in Reference 3, include dropping a single irradiated fuel assembly and handling tool or a heavy object onto other irradiated fuel assemblies. The requirements of LCO 3.9.3, "Containment Penetrations," LCO 3.9.6, "Refueling Cavity Water Level," and the minimum decay time of 100 hours prior to CORE ALTERATIONS ensure that the release of fission product radioactivity, subsequent to a fuel handling accident in the containment, results in doses that are well below the guideline values specified in 10 CFR 100.

(continued)

BASES

APPLICABLE SAFETY ANALYSIS (continued)

The FHBEFS satisfies Criterion 3 of the NRC Policy Statement.

LCO

The FHBEFS is required to be OPERABLE to provide filtration of contamination following a fuel handling accident. In addition, the FHBEFS is required to be in the post-accident mode of operation to: 1) assure immediate availability of filtration during movement of irradiated fuel assemblies in the fuel handling building when irradiated fuel assemblies with < 60 days of decay time are in the fuel handling building; 2) during movement of irradiated fuel assemblies in the containment when irradiated fuel assemblies with < 60 days decay time are in the containment and the containment hatch is not intact; and 3) during CORE ALTERATIONS with the equipment hatch not intact. Total system failure could result in the atmospheric release from the fuel handling building exceeding the 10 CFR 100 (Ref. 4) guidelines in the event of a fuel handling accident.

The FHBEFS is considered OPERABLE when the individual components necessary to control radioactive releases are OPERABLE. This system is shared by the two units. The FHBEFS is considered OPERABLE when:

a. Any two main exhaust fans are OPERABLE (both of these may be shared by other required ventilation systems);

b. One charcoal booster fan is OPERABLE, and either operating or capable of automatic actuation (this fan may be shared with PTEFS);

c. HEPA filter and charcoal adsorber are not excessively restricting flow, and are capable of performing their filtration function as determined by the Ventilation Filter Testing Program (VFTP); and

d. Ductwork and dampers are OPERABLE, and air circulation can be maintained.

e. The FHBEFS can maintain a pressure of ≤-.25" water gauge with respect to atmospheric pressure during the post-accident mode of operation.

(continued)

BASES

LCO (continued)

f. No ventilation flow path exists from the Containment and Fuel Handling Building into the Pipe Tunnel.

g. With the equipment hatch not intact, the Containment Shield Wall must be removed in order for the FHBEFS to function correctly in the post-accident mode of operation.

Equipment normally associated with either unit may fulfill the required functions. However, if the opposite-unit equipment is credited, all opposite-unit support equipment necessary to maintain OPERABILITY must also be OPERABLE.

APPLICABILITY

During movement of irradiated fuel in the fuel handling area, during movement of irradiated fuel in the containment with the equipment hatch not intact, and during CORE ALTERATIONS with the equipment hatch not intact, the FHBEFS is required to be OPERABLE to alleviate the consequences of a fuel handling accident. In addition, the FHBEFS is required to be in the post-accident mode of operation when there is potential for damage to irradiated fuel assemblies with < 60 days of decay time to assure immediate availability of filtration following a fuel handling accident. The equipment hatch is considered to be "intact" when held in place by at least four bolts and at least one personnel air lock door is closed.

ACTIONS

The ACTIONS are modified by a Note indicating that LCO 3.0.3 does not apply. The inoperability of the FHBEFS does not impact the safe operation of the plant, nor the analyzed response to operational events. Therefore, an inoperable FHBEFS is not sufficient reason to require a reactor shutdown.

(continued)

ACTIONS (continued)

A.1 and A.2

With the FHBEFS not in the post-accident mode of operation when required (i.e., during movement of irradiated fuel assemblies in the fuel handling building when irradiated fuel assemblies with < 60 days of decay time are in the fuel handling building, during movement of irradiated fuel assemblies in the containment when irradiated fuel assemblies with < 60 days decay time are in the containment and the equipment hatch is not intact, and during CORE ALTERATIONS with the equipment hatch not intact), action must be taken to immediately place the FHBEFS in the post-accident mode of operation. If the FHBEFS can not be placed in the post-accident mode operation, then the system must be immediately declared inoperable.

B.1, C.1, and D.1

With the FHBEFS inoperable, action must be taken to suspend movement of irradiated fuel assemblies in the fuel handling building, and if the equipment hatch is not intact, action must also be taken to suspend movement of irradiated fuel assemblies in the containment and suspend CORE ALTERATIONS. These actions preclude a fuel handling accident that may result in an unfiltered release. This does not preclude the movement of fuel assemblies to a safe position.

SURVEILLANCE REQUIREMENTS

SR 3.7.13.1

Periodic verification of the required post-accident mode of operation of the FHBEFS assures immediate availability of filtration following a fuel handling accident. This SR is only required during movement of irradiated fuel assemblies in the fuel handling building when irradiated fuel assemblies with < 60 days of decay time are in the fuel handling building, during movement of irradiated fuel assemblies in the containment when irradiated fuel assemblies with < 60 days decay time are in the containment and the equipment hatch is not intact, and during CORE ALTERATIONS with the equipment hatch not intact. A 12 hour Frequency is sufficient, considering the system indications and alarms available to the operator for monitoring the FHBEFS in the control room.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.13.2

This SR verifies FHBEFS is OPERABLE by verifying there is no ventilation flow path from the Containment or Fuel Handling Building to the Pipe Tunnel. This verification consists of ensuring that the ventilation ductwork spool piece has been installed in the Pipe Tunnel to Auxiliary Building ventilation ductwork. Installation of this spool piece ensures by design measure that radioactive releases as a result of a Fuel Handling Accident inside containment when the Containment Shield Wall is not installed and the Equipment Hatch is removed, or radioactive releases as a result of a Fuel Handling Accident in the Fuel Handling Building when the Containment Shield Wall is not installed are routed through the Auxiliary Building Charcoal Filtration Units.

This Surveillance is modified by a NOTE that requires the Surveillance when the Containment Shield Wall is not installed. When the FHBEFS is required to be OPERABLE or is required to be in operation, in order for the FHBEFS to function correctly in the post-accident mode of operation with the Containment Shield Wall removed, the ventilation spool piece must be installed in the Auxiliary Building to Pipe Tunnel ventilation ductwork. This is because with the Containment Shield Wall removed and the equipment hatch removed, a potential ventilation flow path exists from the containment into the pipe tunnel unless the Auxiliary Building to Pipe Tunnel ventilation spool piece is installed. Also, if the Containment Shield Wall is not installed when handling irradiated fuel in the fuel handling building, a potential ventilation flow path exists from the fuel handling building into the pipe tunnel unless the ventilation ductwork spool piece is installed.

Seven days was chosen as an appropriate period of time based upon the need to ensure installation of the ventilation spool piece within a reasonable period of time prior to moving irradiated fuel in the fuel handling building, moving irradiated fuel in the containment with the equipment hatch not intact, or performing CORE ALTERATIONS with the

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.13.2 (continued

equipment hatch not intact. Correct ventilation alignment is verified during the time when the FHBEFS is required to be OPERABLE or in operation, and the Containment Shield Wall is not installed.

SR 3.7.13.3

Standby systems should be checked periodically to ensure that they function properly. As the environmental and normal operating conditions on this system are not severe, testing the system once every 31 days provides an adequate check on this system.

The system has no heaters and therefore, need only be operated for ≥ 15 minutes to demonstrate the function of the system. The 31 day Frequency is based on the known reliability of the equipment and the redundancy available.

SR 3.7.13.4

This SR verifies that the required FHBEFS testing is performed in accordance with the Ventilation Filter Testing Program (VFTP). The FHBEFS filter tests are in general conformance with ANSI N510-1975 (Ref. 5).

The VFTP includes testing HEPA filter performance, charcoal adsorber efficiency, and the physical properties of the activated charcoal. Specific test frequencies and additional information are discussed in detail in the VFTP.

SR 3.7.13.5

This SR verifies that the FHBEFS starts and the supply damper closes on an actual or simulated actuation signal. Actuation signals are identified in LCO 3.3.8, "FHBEFS Actuation Instrumentation." Automatic actuation is not required when the system is operating in the post-accident mode of operation, hence, this SR is not required if the system is operating in the post-accident mode. The 18 month Frequency is consistent with Reference 6.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.7.13.6

This SR verifies the integrity of the fuel handling building enclosure. The ability of the fuel handling building to maintain negative pressure with respect to potentially uncontaminated adjacent areas is periodically tested to verify proper function of the FHBEFS. The FHBEFS in the post-accident mode is designed to maintain a ≤ -0.25 inches water gauge with respect to atmospheric pressure at a flow rate of ≤ 24,000 cfm from the fuel handling building. The Frequency of 18 months is consistent with the guidance provided in NUREG-0800 (Ref. 7).

REFERENCES

1. UFSAR, Section 9.4.3.
2. UFSAR, Section 15.7.4.
3. Regulatory Guide 1.25, "Assumptions Used for Evaluating the Potential Radiological Consequences of a Fuel Handling Accident in the Fuel Handling and Storage Facility for Boiling and Pressurized Water Reactors," Rev. 0.
4. 10 CFR 100, "Reactor Site Criteria."
5. ANSI N510, "Testing of Nuclear Air-Cleaning Systems," 1975.
6. Regulatory Guide 1.52, "Design, Testing, and Maintenance Criteria for Post-Accident Engineered Safety Feature Atmosphere Cleanup System Air Filtration and Adsorption Units of Light Water Cooled Nuclear Power Plants," Rev. 2.
7. NUREG-0800, Section 6.5.1, Rev. 2, July 1981.

CTS MARKUPS

LIMITING CONDITION FOR OPERATION

3.7.13, 3.3.8

3.13.2. Protection from Damaged Spent Fuel

3.7.13

A. During irradiated fuel movement or crane operation with loads over irradiated fuel in the fuel building, the fuel building exhaust system shall be: (3.7-38)

3.7.13.a

1. Operating with ventilation flow through the HEPA and charcoal filters if there is any irradiated fuel stored in the pool with less than 60 days decay time. (3.7-12) (3.7-39)

3.3.8 APPL

3.7.13.a

LCO 3.3.8 RA A.1

2. OPERABLE with automatic initiation of flow through the HEPA filters and charcoal adsorbers upon detection of high radiation at the fuel pool if all irradiated fuel stored in the pool has 60 days or greater decay time since irradiation ceased. If automatic actuation is inoperable, the system shall be manually placed in the "charcoal adsorber mode".

APPLICABILITY: All Modes (3.7-40)

3.7.13 RA B.1

ACTION: With the requirements of 3.13.2.A not satisfied, suspend all irradiated fuel movements or crane operation with loads over irradiated fuel after first, if applicable, placing loads in a safe condition. (3.7-38) (3.7-12)

(3.7-41) Add LCO 3.7.13 RAs A.1 & A.2

SURVEILLANCE REQUIREMENTS

3.7.13

4.13.2. Protection from Damaged Spent Fuel

A. The charcoal adsorber mode of operation of the fuel building exhaust system shall be demonstrated to be operable:

SR 3.7.13.2

1. Observe and document shiftly that the ventilation system is OPERATING as required by Specification 3.13.2.A.

SR 3.7.13.2 Note (a)

(3.3.8-1)

2. When operability is required by Specification 3.13.2.A.2, the following shall be done at least once per 31 days:

SR 3.7.13.3

a. Place the Fuel Building Ventilation System in the Fuel Handling Mode for a minimum of 15 minutes.

SR 3.7.13.3

b. Verify flow through the HEPA and charcoal adsorber train.

SR 3.7.13.6

c. Verify the Fuel Building is maintained at 1/4 inch of water negative pressure with respect to the atmosphere.

LIMITING CONDITION FOR OPERATION	SURVEILLANCE REQUIREMENTS
3.7.13 3.13.2 B. Ventilation filters for the fuel building including charcoal adsorbers and the automatic actuation of the charcoal filter system shall be periodically tested. SR 3.7.13.4 5.5.9 SR 3.7.13.5	3.7.13, 3.3.8, 5.0 4.13.2 B. For each HEPA or charcoal filter, at least once per 18 months or (1) after every 720 hours of charcoal adsorber operation or (2) after any structural maintenance of the filter housings or (3) following painting, fire, or chemical release in any ventilation zone communicating with the system, or (4) after each complete or partial replacement of the filter bank, surveillance will be performed per Table 4.17. 5.5.9 5-31 Table 3.3.8-1 SR 3.7.13.5 1. Verify that on a high radiation test signal the system automatically starts (unless already in operation) and directs its exhaust flow through the HEPA filters and charcoal adsorber banks. If automatic actuation is inoperable the system shall be manually placed in the charcoal adsorber mode. SR 3.7.13.5 NOTE 3.7-12 3.3.8 RA A.1/B.1/C.1 3.3.8-4 Add LCO 3.3.8 RA B.2/C.2

3.13.3 Containment status

(3.9-14) LCO 3.9.3 — A. During CORE ALTERATION, CONTAINMENT INTEGRITY shall be maintained as specified in section 3.9.5 except as specified in 3.13.3.B.

(3.7-42) LCO 3.7.13 (3.9-16) (3.9-30)

B. The equipment hatch or both doors on the personnel hatch may be opened during the CORE ALTERATION provided the shutdown margin is maintained equal to or greater than 10% ΔK/K and Tavg maintained at or less than 140°F.

(3.9-15) (3.9-3) C. During CORE ALTERATION, the containment vent and purge system and the radiation monitors which initiate isolation of this system, shall be OPERABLE. LCO 3.3.6

(3.9-5) → A... 3.13.1 + (3.9-43)

(3.7-42) Add LCO 3.7.13 b & c.

Add SR 3.7.13.2 Note (b & c)

~~4.13.3~~ Containment status

SR 3.9.3.1 ← A. Containment door status shall be verified once a shift. (3.9-16)

(3.9-30) — B. Reactor coolant boron concentration and Tavg shall be verified once a shift when the equipment hatch is open or both doors on the personnel hatch are open.

(3.9-17) SR 3.9.3.1, SR 3.9.3.2 with Note, SR 3.9.3.3 with Note

C. The containment vent and purge system and the radiation monitors which initiate isolation of this system shall be tested and verified to be OPERABLE immediately prior to CORE ALTERATION operations. → LCO 3.3.6

DOC CHANGES

<u>NSHC</u> <u>NO.</u> <u>DISCUSSION</u>

M. 39. The Applicability of the requirements for operation of the fuel handling building exhaust filter system have been expanded from "if there is any irradiated fuel stored in the pool with less than 60 days decay time" to "during movement of irradiated fuel assemblies in the fuel handling building when irradiated fuel assemblies with < 60 days decay time are in the fuel handling building." This includes any time the fuel assembly is in the building (during irradiated fuel movements) rather than just while the fuel assembly is stored in the fuel pool. This is consistent with NUREG-1431 and is an additional restriction on plant operation. (Note: This change also restricts the Applicability to only during the movement of irradiated fuel assemblies. Heavy loads controls for other than during movement of irradiated fuel assemblies are addressed as Relocated ("R") administrative controls in another item of this Amendment request.)

A. 40. The conditions of Applicability have been clarified to describe the conditions identified in the existing Specification. This change is consistent with NUREG-1431 and is considered administrative.

A. 41. Required Actions have been added (Required Actions A.1 and A.2) to identify appropriate actions for the FHBEFS not in operation when required. This is incorporated in accordance with current Technical Specification 3.13.2.

M. 42. An additional restriction is added to assure compliance with the NRC Safety Evaluation which supported the removal of the equipment hatch during refueling operations and CORE ALTERATIONS. This is an additional restriction on plant operation.

M. 43. ~~Not used.~~ A new Surveillance Requirement (SR 3.7.13.2) has been added to LCO 3.7.13 to verify that the ventilation system will correctly function in the post-accident mode of operation during the period of time the Shield Wall is not intact. This is done by verifying that a ventilation spool piece has been installed between the Auxiliary Building and Pipe Tunnel, such that no ventilation flow path exists from the FHBEFS to the Pipe Tunnel.

L-9. 44. The bounding design basis fuel handling accident in the fuel storage pool assumes an irradiated fuel assembly is dropped onto an array of irradiated fuel assemblies seated in the fuel storage pool racks. The movement of other loads over irradiated fuel assemblies is administratively controlled based on available analysis for an individual load. The movement of control rods over the fuel storage pool has been relocated to these existing administrative controls.

NUREG MARKUPS

CTS 3.13.2 3.13.3 3.13.6 3.15

3.7 PLANT SYSTEMS

3.7.13 Fuel Handling Building ~~Air Cleanup~~ Exhaust Filter System (~~FBACS~~ FHBEFS) — Generic change

CLB NRC letter Am. 56

LCO 3.7.13 — The FHBEFS ~~Two FBACS trains~~ shall be OPERABLE. In addition, the FHBEFS shall be in operation during: a. b. c. } Conditions for required operation.

(19) APPLICABILITY: ~~[MODES 1, 2, 3, and 4,]~~ During movement of irradiated fuel assemblies in the fuel building.

Not related to OPS. (20) Add NOTE LCO 3.0.3 NA. — Add APP for moving fuel in cont / CORE ALTs w/ equip. hatch not intact

ACTIONS

CONDITION	REQUIRED ACTION		COMPLETION TIME
(19) A. Required ~~One~~ FBACS ~~train~~ ~~inoperable.~~ not in operation.	A.1	Place FHBEFS in operation.	Immediately
	~~A.1~~ OR	~~Restore FBACS train to OPERABLE status.~~	~~7 days~~
	A.2	Declare FHBEFS inoperable.	Immediately
(20) [B. Required Action and associated Completion Time of Condition A not met in MODE 1, 2, 3, or 4. OR Two FBACS trains inoperable in MODE 1, 2, 3, or 4.]	B.1	Be in MODE 3.	5 hours
	AND		
	B.2	Be in MODE 5.	36 hours
(19) C. Required Action and associated Completion Time [of Condition A] not met during movement of irradiated fuel assemblies in the fuel building.	C.1	Place OPERABLE FBACS train in operation.	Immediately
	OR		
	C.2	Suspend movement of irradiated fuel assemblies in the fuel building.	Immediately

(continued)

ACTIONS (continued)

CONDITION	REQUIRED ACTION	COMPLETION TIME
B C D. Two FBACS trains inoperable during movement of irradiated fuel assemblies in the fuel handling building.	B.1 C.1 D.1 Suspend movement of irradiated fuel assemblies in the fuel building. handling ΔC - in cont w/ hatch not intact. ΔD - CORE ALTS	Immediately

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
CTS 4.13.2.A.2.a/b SR 3.7.13.1 3	Operate each FBACS train for [≥ 10 continuous hours with the heaters operating or (for systems without heaters) ≥ 15 minutes].	31 days
CTS 3.13.2.B 3.17.1 SR 3.7.13.2 4	Perform required FBACS filter testing in accordance with the [Ventilation Filter Testing Program (VFTP)].	In accordance with the [VFTP]
4.13.2.3.1 [SR 3.7.13.3 5	Add NOTE: Not req'd if in operation. Verify each FBACS train actuates on an actual or simulated actuation signal.	[18] months]
4.13.2.A2.C SR 3.7.13.4 6	Verify one FBACS train can maintain a pressure ≤ [-0.025] inches water gauge with respect to atmospheric pressure during the [post accident] mode of operation at a flow rate ≤ [20,000] cfm. 24,000	[18] months on a STAGGERED TEST BASIS

(continued)

SR 3.7.13.2 NOTE Not required with Containment Shield Wall is installed

Verify FBACS is OPERABLE by ensuring no ventilation flowpath exists from the Containment and Fuel handling Building into the Upper ... | 7 days

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.7.13.5	Verify each FBACS filter bypass damper can be closed.	[18] months

NA Not in design

CTS 4.13.2.A.1

A6&

19

SURVEILLANCE		FREQUENCY
SR 3.7.13.1	------------- NOTE ------------- only required for fuel w/ <60 days decay time or CORE ALTs w/ hatch not intact. ------------------------------- Verify FHBEFS in operation.	12 hours

B 3.7 PLANT SYSTEMS

B 3.7.13 Fuel Building Air Cleanup System (FBACS)

BASES

BACKGROUND

The FBACS filters airborne radioactive particulates from the area of the fuel pool following a fuel handling accident or loss of coolant accident (LOCA). The FBACS, in conjunction with other normally operating systems, also provides environmental control of temperature and humidity in the fuel pool area.

The FBACS consists of two independent and redundant trains. Each train consists of a heater, a prefilter or demister, a high efficiency particulate air (HEPA) filter, an activated charcoal adsorber section for removal of gaseous activity (principally iodines), and a fan. Ductwork, valves or dampers, and instrumentation also form part of the system, as well as demisters, functioning to reduce the relative humidity of the airstream. A second bank of HEPA filters follows the adsorber section to collect carbon fines and provide backup in case the main HEPA filter bank fails. The downstream HEPA filter is not credited in the analysis, but serves to collect charcoal fines, and to back up the upstream HEPA filter should it develop a leak. The system initiates filtered ventilation of the fuel handling building following receipt of a high radiation signal.

The FBACS is a standby system, parts of which may also be operated during normal plant operations. Upon receipt of the actuating signal, normal air discharges from the building, the fuel handling building is isolated, and the stream of ventilation air discharges through the system filter trains. The prefilters or demisters remove any large particles in the air, and any entrained water droplets present, to prevent excessive loading of the HEPA filters and charcoal adsorbers.

The FBACS is discussed in the FSAR, Sections [6.5.1], [9.4.5], and [15.7.4] (Refs. 1, 2, and 3, respectively) because it may be used for normal, as well as post accident, atmospheric cleanup functions.

(continued)

INSERT B43B

<u>INSERT B66A</u>

The FHBEFS is placed in the post-accident mode of operation during movement of fuel which has been recently removed from the reactor and during CORE ALTERATIONS with the containment equipment hatch not intact. In order for the FHBEFS to function correctly in the post-accident mode of operation with the Containment Shield Wall removed, a ventilation ductwork spool piece must be installed. This spool piece is installed in the Pipe Tunnel Ventilation System from damper OPDV-AV172 to the top of the Unit 1 vertical pipe chase or from damper OPDV-AV173 to the top of the Unit 2 vertical pipe chase.

BASES (continued)

APPLICABLE SAFETY ANALYSES

The FBACS design basis is established by the consequences of the limiting Design Basis Accident (DBA), which is a fuel handling accident. The analysis of the fuel handling accident, given in Reference 3, assumes that all fuel rods in an assembly are damaged. The analysis of the LOCA assumes that radioactive materials leaked from the Emergency Core Cooling System (ECCS) are filtered and adsorbed by the FBACS. The DBA analysis of the fuel handling accident assumes that only one train of the FBACS is functional due to a single failure that disables the other train. The accident analysis accounts for the reduction in airborne radioactive material provided by the one remaining train of this filtration system. The amount of fission products available for release from the fuel handling building is determined for a fuel handling accident and for a LOCA. These assumptions and the analysis follow the guidance provided in Regulatory Guide 1.25 (Ref. 4).

INSERT B67A

The FBACS satisfies Criterion 3 of the NRC Policy Statement.

LCO

Two independent and redundant trains of the FBACS are required to be OPERABLE to ensure that at least one train is available, assuming a single failure that disables the other train, coincident with a loss of offsite power. Total system failure could result in the atmospheric release from the fuel handling building exceeding the 10 CFR 100 (Ref. 5) limits in the event of a fuel handling accident.

INSERT B67B

The FBACS is considered OPERABLE when the individual components necessary to control exposure in the fuel handling building are OPERABLE in both trains. An FBACS train is considered OPERABLE when its associated:

a. Fan is OPERABLE;

b. HEPA filter and charcoal adsorber are not excessively restricting flow, and are capable of performing their filtration function; and

c. Heater, demister, ductwork, valves, and dampers are OPERABLE, and air circulation can be maintained.

INSERT B67C

(continued)

INSERT B43B

INSERT B67A

The FHBEFS is also assumed to provide filtration for fuel handling accidents inside containment if the equipment hatch is not intact and the Containment Shield Wall is removed during CORE ALTERATIONS or movement of irradiated fuel assemblies within containment. The most severe radiological consequences resulting from a fuel handling accident in the containment that involves damage to irradiated fuel (Ref. 2). Fuel handling accidents, analyzed in Reference 3, include dropping a single irradiated fuel assembly and handling tool or a heavy object onto other irradiated fuel assemblies. The requirements of LCO 3.9.3, "Containment Penetrations," LCO 3.9.6, "Refueling Cavity Water Level," and the minimum decay time of 100 hours prior to CORE ALTERATIONS ensure that the release of fission product radioactivity, subsequent to a fuel handling accident in the containment, results in doses that are well below the guideline values specified in 10 CFR 100.

INSERT B67B

provide filtration of contamination following a fuel handling accident. In addition, the FHBEFS is required to be in the post-accident mode of operation to: 1) assure immediate availability of filtration during movement of irradiated fuel assemblies in the fuel handling building when irradiated fuel assemblies with < 60 days of decay time are in the fuel handling building; 2) during movement of irradiated fuel assemblies in the containment when irradiated fuel assemblies with < 60 days decay time are in the containment and the containment hatch is not intact; and 3) during CORE ALTERATIONS with the containment hatch not intact.

INSERT B43B

INSERT B67C

This system is shared by the two units. The FHBEFS is considered OPERABLE when:

a. Any two main exhaust fans are OPERABLE (both of these may be shared by other required ventilation systems);

b. One charcoal booster fan is OPERABLE, and either operating or capable of automatic actuation (this fan may be shared with PTEFS);

c. HEPA filter and charcoal adsorber are not excessively restricting flow, and are capable of performing their filtration function as determined by the Ventilation Filter Testing Program (VFTP); and

d. Ductwork and dampers are OPERABLE, and air circulation can be maintained.

e. The FHBEFS can maintain a pressure of $\leq$-.25" water gauge with respect to atmospheric pressure during the post-accident mode of operation.

f. No ventilation flow path exists from the Containment and Fuel Handling Building into the Pipe Tunnel.

g. With the equipment hatch not intact, the Containment Shield Wall must be removed in order for the FHBEFS to function correctly in the post-accident mode of operation.

Equipment normally associated with either unit may fulfill the required functions. However, if the opposite-unit equipment is credited, all opposite-unit support equipment necessary to maintain OPERABILITY must also be OPERABLE.

BASES (continued)

APPLICABILITY

In MODE 1, 2, 3, or 4, the FBACS is required to be OPERABLE to provide fission product removal associated with ECCS leaks due to a LOCA and leakage from containment and annulus.

In MODE 5 or 6, the FBACS is not required to be OPERABLE since the ECCS is not required to be OPERABLE.

INSERT B68A

During movement of irradiated fuel in the fuel handling area, the FBACS is required to be OPERABLE to alleviate the consequences of a fuel handling accident.

ACTIONS

INSERT B68B

A.1 and A.2

With ~~one~~ the required FBACS ~~train inoperable~~ not in operation when required, action must be taken to restore OPERABLE status within 7 days. During this period, the remaining OPERABLE train is adequate to perform the FBACS function. The 7 day Completion Time is based on the risk from an event occurring requiring the inoperable FBACS train, and the remaining FBACS train providing the required protection.

immediately place the FHBEFS in operation.

B.1 and B.2

In MODE 1, 2, 3, or 4, when Required Action A.1 cannot be completed within the associated Completion Time, or when both FBACS trains are inoperable, the unit must be placed in a MODE in which the LCO does not apply. To achieve this status, the unit must be placed in MODE 3 within 6 hours, and in MODE 5 within 36 hours. The Completion Times are reasonable, based on operating experience, to reach the required unit conditions from full power conditions in an orderly manner and without challenging unit systems.

C.1 and C.2

When Required Action A.1 cannot be completed within the required Completion Time, during movement of irradiated fuel assemblies in the fuel building, the OPERABLE FBACS train must be started immediately or fuel movement suspended. ~~This action ensures that the remaining train is OPERABLE.~~

If FHBEFS cannot be placed in operation, then the system must be immediately declared inoperable.

(continued)

INSERT B43B

INSERT B68A

During movement of irradiated fuel in the fuel handling area, during movement of irradiated fuel in the containment with the equipment hatch not intact, and during CORE ALTERATIONS with the equipment hatch not intact, the FHBEFS is required to be OPERABLE to alleviate the consequences of a fuel handling accident. In addition, the FHBEFS is required to be in the post-accident mode of operation when there is potential for damage to irradiated fuel assemblies with < 60 days of decay time to assure immediate availability of filtration following a fuel handling accident.

The equipment hatch is considered to be "intact" when held in place by at least four bolts and at least one personnel air lock door is closed.

INSERT B68B

The ACTIONS are modified by a Note indicating that LCO 3.0.3 does not apply. The inoperability of the FHBEFS does not impact the safe operation of the plant, nor the analyzed response to operational events. Therefore, an inoperable FHBEFS is not sufficient reason to require a reactor shutdown.

BASES

ACTIONS

C.1 and C.2 (continued)

that no undetected failures preventing system operation will occur, and that any active failure will be readily detected.

If the system is not placed in operation, this action requires suspension of fuel movement, which precludes a fuel handling accident. This does not preclude the movement of fuel assemblies to a safe position.

B.1, C.1, and D.1

When two trains of the FBACS are is inoperable during movement of irradiated fuel assemblies in the fuel building, action must be taken to place the unit in a condition in which the LCO does not apply. Action must be taken immediately to suspend movement of irradiated fuel assemblies in the fuel building. This does not preclude the movement of fuel to a safe position.

INSERT B69A

SURVEILLANCE REQUIREMENTS

New SR's

INSERT B69C

SR 3.7.13.1 3

INSERT B69B

Standby systems should be checked periodically to ensure that they function properly. As the environmental and normal operating conditions on this system are not severe, testing each train once every month 31 days provides an adequate check on this system.

Monthly heater operation dries out any moisture accumulated in the charcoal from humidity in the ambient air. [Systems with heaters must be operated for ≥ 10 continuous hours with the heaters energized. Systems without heaters need only be operated for ≥ 15 minutes to demonstrate the function of the system.] The 31 day Frequency is based on the known reliability of the equipment and the two train redundancy available.

The system has no heaters and therefore

Δ like CREFS

[SR 3.7.13.2

This SR verifies that the required FBACS testing is performed in accordance with the [Ventilation Filter Testing]

(continued)

INSERT B43B

INSERT B69A

With the FHBEFS inoperable, action must be taken to suspend movement of irradiated fuel assemblies in the fuel handling building, and if the equipment hatch is not intact, action must also be taken to suspend movement of irradiated fuel assemblies in the containment and suspend CORE ALTERATIONS. These actions preclude a fuel handling accident that may result in an unfiltered release.

INSERT B69B

SR 3.7.13.1

Periodic verification of this required operation of the FHBEFS assures immediate availability of filtration following a fuel handling accident. This SR is only required during movement of irradiated fuel assemblies in the fuel handling building when irradiated fuel assemblies with < 60 days of decay time are in the fuel handling building, during movement of irradiated fuel assemblies in the containment when irradiated fuel assemblies with < 60 days decay time are in the containment and the equipment hatch is not intact, and during CORE ALTERATIONS with the equipment hatch not intact. A 12 hour Frequency is sufficient, considering the system indications and alarms available to the operator for monitoring the FHBEFS in the control room.

INSERT B69C

SR 3.7.13.2

This SR verifies FHBEFS is OPERABLE by verifying there is no ventilation flow path from the Containment or Fuel Handling Building to the Pipe Tunnel. This verification consists of ensuring that the ventilation ductwork spool piece has been installed in the Pipe Tunnel to Auxiliary Building ventilation ductwork. Installation of this spool piece ensures by design measure that radioactive releases as a result of a Fuel Handling Accident inside containment when the Containment Shield Wall is not installed and the Equipment Hatch is removed, or radioactive releases as a result of a Fuel Handling Accident in the Fuel Handling Building when the Containment Shield Wall is not installed are routed through the Auxiliary Building Charcoal Filtration Units.

INSERT B43B

INSERT B69C (continued)

This Surveillance is modified by a NOTE that requires the Surveillance when the Containment Shield Wall is not installed. When the FHBEFS is required to be OPERABLE or is required to be in operation, in order for the FHBEFS to function correctly in the post-accident mode of operation with the Containment Shield Wall removed, the ventilation spool piece must be installed in the Auxiliary Building to Pipe Tunnel ventilation ductwork. This is because with the Containment Shield Wall removed and the equipment hatch removed, a potential ventilation flow path exists from the containment into the pipe tunnel unless the Auxiliary Building to Pipe Tunnel ventilation spool piece is installed. Also, if the Containment Shield Wall is not installed when handling irradiated fuel in the fuel handling building, a potential ventilation flow path exists from the fuel handling building into the pipe tunnel unless the ventilation ductwork spool piece is installed.

Seven days was chosen as an appropriate period of time based upon the need to ensure installation of the ventilation spool piece within a reasonable period of time prior to moving irradiated fuel in the fuel handling building, moving irradiated fuel in the containment with the equipment hatch not intact, or performing CORE ALTERATIONS with the equipment hatch not intact. Correct ventilation alignment is verified during the time when the FHBEFS is required to be OPERABLE or in operation, and the Containment Shield Wall is not installed.

BASES

SURVEILLANCE REQUIREMENTS

SR 3.7.13.2 (continued)

Program (VFTP)]. The FBACS filter tests are in accordance with Regulatory Guide 1.52 (Ref. 6). 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 3.7.13.3

This SR verifies that each FBACS train starts and operates on an actual or simulated actuation signal. The [18] month Frequency is consistent with Reference 6.

SR 3.7.13.4

This SR verifies the integrity of the fuel building enclosure. The ability of the fuel building to maintain negative pressure with respect to potentially uncontaminated adjacent areas is periodically tested to verify proper function of the FBACS. During the [post accident] mode of operation, the FBACS is designed to maintain a slight negative pressure in the fuel building, to prevent unfiltered LEAKAGE. The FBACS is designed to maintain a ≤ [-0.125] inches water gauge with respect to atmospheric pressure at a flow rate of [20,000] cfm to the fuel building. The Frequency of [18] months is consistent with the guidance provided in NUREG-0800, Section 6.5.1 (Ref. 7).

This test is conducted with the tests for filter penetration; thus, an [18] month Frequency (on a STAGGERED TEST BASIS) is consistent with Reference 6.

SR 3.7.13.5

Operating the FBACS filter bypass damper is necessary to ensure that the system functions properly. The OPERABILITY of the FBACS filter bypass damper is verified if it can be closed. An [18] month Frequency is consistent with Reference 6.

(continued)

BASES (continued)

REFERENCES

~~1. FSAR, Section [6.5.1].~~

1 2. UFSAR, Section [9.4.5].

2 3. UFSAR, Section [15.7.4].

3 4. Regulatory Guide 1.25.

4 5. 10 CFR 100.

6. Regulatory Guide 1.52, (Rev. 2).

7. NUREG-0800, Section 6.5.1, Rev. 2, July 1981.

5. ANSI N510, "Title", 1975.

edit

MARK UP OF DOD CHANGE

CHANGE NUMBER — DISCUSSION

19. NUREG LCO 3.7.13; Proposed LCO 3.7.13:
The FHBEFS is a single train system and is required to be "in the post-accident mode of operation" under certain conditions. The SR for auto start is not required if the system is in the post accident mode of operation.

20. NUREG LCO 3.7.13; Proposed LCO 3.7.13:
A NOTE is added to indicate LCO 3.0.3 is not applicable for this system since the APPLICABILITY does not include MODES 1, 2, 3, and 4. The Actions are also modified to reflect the APPLICABILITY.

21. NUREG LCO 3.7.16; Proposed LCO 3.7.15:
An additional Applicability is included to address the period beginning with the initial movement of fuel until the end of that movement. The NUREG Applicability could be read to begin at the end of the movement of fuel. Additionally, the applicability has been revised to limit application of this LCO to Region 2 of the storage racks. This is consistent with the analysis in that unlimited fuel storage is allowed in Region 1, and also consistent with Required Action A.2.2, which is intended to exit the Mode of applicability for the LCO.

22. Not used.

23. NUREG LCO 3.7.16; Proposed LCO 3.7.15:
The Frequency of the Fuel Storage Pool Boron Concentration Surveillance is retained as 31 days as approved in February 1993 for Zion, Amendments 142/131.

24. NUREG LCO 3.7.16; Proposed LCO 3.7.15:
The allowance to store fuel "in accordance with Specification 4.3.1.1" is omitted. Zion Station does not currently have an analysis to support special configuration loading of fuel from the Unacceptable Burnup Domain in Region 2 of the spent fuel storage pool. This item is also omitted from NUREG Specification 4.3.1.1.f.

25. NUREG LCO 3.7.5; Proposed LCO 3.7.5:
NUREG SR 3.7.5.2 is reworded to more completely reflect the actual testing required. That testing is required by and performed in accordance with the Inservice Testing Program, which encompasses testing criteria in addition to the NUREG stated developed head criteria.

26. NUREG LCO 3.7.5; Proposed LCO 3.7.5:
NUREG SR 3.7.5.3 is eliminated. The Zion AFW System design does not include any automatic valve actuation on system initiation other than the steam supply valve for the turbine driven AFW pump. This steam supply valve actuation is adequately addressed in the NUREG SR 3.7.5.4 (proposed SR 3.7.5.3) test, and is not necessary to be a separate surveillance.

CHANGE NUMBER	DISCUSSION
38.	Additional information concerning the acceptable operating mode of the Fuel Handling Building Exhaust Filtration System (FHBEFS)is provided. In order to meet the technical specification requirements the FHBEFS must be in the post-accident mode of operation.
39.	A new Surveillance Requirement has been added to LCO 3.7.13 to verify that the ventilation system is OPERABLE during the period of time the Shield Wall or Equipment Hatch is not intact. This is done by verifying that a ventilation spool piece has been installed between the Auxiliary Building and Pipe Tunnel, such that no ventilation flow path exists from the FHBEFS to the Pipe Tunnel.

ATTACHMENT 4

Changes to the Containment Spray and Reactor Containment Fan Coolers Limiting Conditions for Operation and BASES

MARK UP OF ITS CHANGE

OI SR 3.6.6.2 - Reinstate previously deleted SR 3.6.6.2

SR 3.6.6.2 for SW flow verification is reinstated. Discussion changed to make the SR verify SW System configuration required to support post-accident SW flow to the RCFC units, consistent with SR 3.7.8.1.

SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.6.1	Operate each RCFC at low speed for ≥ 15 minutes.	31 days
SR 3.6.6.2	Verify each RCFC cooling water flow rate ~~is~~would be ≥ 1~~6~~500 gpm under accident conditions.	31 days
SR 3.6.6.3	Verify the diesel driven CS pump fuel oil day tank contains ≥ 46 gallons of fuel oil.	31 days
SR 3.6.6.4	Verify the diesel driven CS pump fuel oil properties are tested in accordance with, and maintained within the limits of the Diesel Fuel Oil Testing Program.	In accordance with the Diesel Fuel Oil Testing Program
SR 3.6.6.5	Verify each automatic CS valve in the flow path that is not locked, sealed, or otherwise secured in position actuates to the correct position on an actual or simulated actuation signal.	18 months
SR 3.6.6.6	Verify each CS pump starts automatically on an actual or simulated actuation signal.	18 months
SR 3.6.6.7	Verify each RCFC starts automatically on an actual or simulated actuation signal.	18 months

(continued)

SURVEILLANCE		FREQUENCY
SR 3.6.6.8	Verify the Accident Inlet, Accident Outlet, and Normal Inlet RCFC dampers that are not locked, sealed, or otherwise secured in their accident position, are in the accident position.	18 months
SR 3.6.6.9	Verify each spray nozzle is unobstructed.	10 years

B 3.6 CONTAINMENT SYSTEMS

B 3.6.6 Containment Spray (CS) and Reactor Containment Fan Cooler (RCFC) Systems

BASES

BACKGROUND

The CS and RCFC Systems provide containment atmosphere cooling to limit post accident pressure and temperature in containment to less than the design values. Reduction of containment pressure and the iodine removal capability of the spray reduces the release of fission product radioactivity from containment to the environment in the event of a Design Basis Accident (DBA).

The CS and RCFC Systems are Engineered Safety Feature (ESF) Systems. They are designed to ensure that the heat removal capability required during the post accident period can be attained. The CS and RCFC Systems provide redundant methods to limit and maintain post accident conditions to less than the containment design values.

Containment Spray System

The CS System consists of three separate trains of equal capacity, two CS trains in conjunction with three RCFCs can provide the required flow for containment pressure control (Ref. 1). Each train includes a containment spray pump, spray headers, nozzles, valves, and piping. Two trains are powered from separate ESF buses. The third train utilizes a separate ESF bus for valve and control power requirements and a dedicated diesel engine to supply motive force to the pump. The refueling water storage tank (RWST) supplies borated water to the CS System during the injection phase of operation. In the recirculation mode of operation, one Residual Heat Removal (RHR) pump is aligned from the containment recirculation sump to the spray header of one motor driven CS pump to provide long term containment cooling. Iodine removal by the CS system is not credited in the analysis during the recirculation mode of operation.

The CS System provides a spray of borated water mixed with sodium hydroxide (NaOH) from the spray additive tank into the upper regions of containment to reduce the containment pressure and temperature and to reduce fission products from the containment atmosphere during a DBA. The RWST solution

(continued)

BASES

BACKGROUND (continued)

temperature is an important factor in determining the heat removal capability of the CS System during the injection phase. In the recirculation mode of operation, heat is removed from the containment recirculation sump water by the RHR coolers. Each train of the CS System provides adequate spray coverage to meet the system design requirements for containment heat removal.

The Spray Additive System injects an NaOH solution into the spray. The resulting alkaline pH of the spray enhances the ability of the spray to scavenge fission products from the containment atmosphere. The NaOH added in the spray also ensures an alkaline pH for the solution in the containment recirculation sump. The alkaline pH of the containment recirculation sump water minimizes the evolution of iodine and minimizes the occurrence of chloride and caustic stress corrosion on mechanical systems and components exposed to the fluid. One CS train can deliver enough NaOH to form the desired solution in the containment recirculation sump when combined with the inventory of the RWST and the spilled reactor coolant.

The CS System is actuated either automatically by a containment High-High pressure signal coincident with a Safety Injection (SI) signal, or manually. An automatic actuation opens the CS pump discharge valves, opens the spray additive tank outlet valves, starts the three CS pumps, and begins the injection phase. A manual actuation of the CS System requires the operator to actuate two Phase B push buttons and either have an SI signal present or activate a manual SI switch to begin the same sequence. The injection phase continues until an RWST low level alarm is received. The low level alarm for the RWST alerts the operator to initiate changeover from injection to recirculation by a series of valve realignments. When the RWST low level alarm is received, two of the CS pumps and both RHR pumps are stopped. An RHR pump can then be aligned to the CS recirculation header and restarted in order to maintain an equilibrium temperature between the containment atmosphere and the recirculated sump water. The remaining CS pump continues to run until the RWST is empty. Operation of an RHR pump in the CS recirculation mode is controlled by the operator in accordance with the emergency operating procedures.

(continued)

BASES

BACKGROUND (continued)

Reactor Containment Fan Cooling System

Five RCFCs are provided (Ref. 2), three of which in conjunction with two CS trains have sufficient capacity to supply 100% of the design cooling requirement. Each fan unit is supplied with cooling water from the Service Water (SW) System at a pressure ≥ 47 psig. Air is drawn into the coolers through the fan and discharged to the lower areas of containment.

During normal operation, the fans are operated at high speed with SW supplied to the cooling coils. The RCFCs, operating in conjunction with the Containment Ventilation System, are designed to limit the ambient containment air temperature during normal unit operation to less than the limit specified in LCO 3.6.5, "Containment Air Temperature." This temperature limitation ensures that the containment temperature does not exceed the initial temperature conditions assumed for the DBAs.

In post accident operation following an actuation signal, the RCFCs are designed to start automatically in low speed if not already running. If running in high (normal) speed, the fans automatically shift to low speed. The fans are operated at the lower speed during accident conditions to prevent motor overload from the higher mass atmosphere. The temperature of the SW is an important factor in the heat removal capability of the fan units.

APPLICABLE SAFETY ANALYSES

The CS System and RCFC System limit the temperature and pressure that could be experienced in containment following a DBA. The limiting DBAs considered are the Loss of Coolant Accident (LOCA) and the Main Steam Line Break (MSLB). The LOCA and MSLB are analyzed using computer codes designed to predict the resultant containment pressure and temperature transients. No two DBAs are assumed to occur simultaneously or consecutively. The postulated DBAs are analyzed with regard to ESF System response. The basis for the safeguards performance is the loss of two fan coolers and one spray pump. This failure is more severe than the usual worst case single failure (i.e.; the loss of one emergency diesel generator), since the worst case single failure would limit the available water flow to the core and thus limit the mass and energy flow from the reactor coolant system to the

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

containment during the reflood period. For an MSLB, offsite power is conservatively assumed available for purposes of determining the mass and energy release to the containment. The assumed worst case failure is a main steam check valve. The safeguards performance (two CS trains and three RCFCs) is consistent with the LOCA analysis.

The analysis and evaluation show that the highest peak containment pressure and the highest peak containment temperature experienced during a LOCA or MSLB meet the intent of the design basis. (See the Bases for LCO 3.6.4, "Containment Pressure," and LCO 3.6.5, "Containment Air Temperature," for a detailed discussion.) The LOCA containment analysis assumes a unit specific power level of 106.4%, two CS trains and three RCFCs operating, and initial (pre-accident) containment conditions of 120°F and 1.0 psig. The MSLB is analyzed at 102% and 0% power and assumes an initial containment pressure of -1.5 psig which tends to maximize the peak temperature. The analyses also assume a response time delayed initiation to provide conservative peak calculated containment pressure and temperature responses.

For certain aspects of transient accident analyses, maximizing the calculated containment pressure is not conservative. In particular, the effectiveness of the Emergency Core Cooling System during the core reflood phase of a LOCA analysis increases with increasing containment backpressure. For these calculations, the containment backpressure is calculated in a manner designed to conservatively minimize, rather than maximize, the calculated transient containment pressures in accordance with 10 CFR 50, Appendix K.

The modeled CS System actuation from the containment analysis is based on a response time associated with exceeding the containment High-High pressure setpoint to achieving full flow through the containment spray nozzles. The CS System total response time of 110 seconds includes diesel generator (DG) startup (for loss of offsite power), block loading of equipment, CS pump startup, and spray line filling (Ref. 3).

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BASES

APPLICABLE SAFETY ANALYSES (continued)

The modeled RCFC System actuation from the containment analysis is based upon a response time associated with exceeding the containment High pressure setpoint to achieving full RCFC air and safety grade cooling water flow. The RCFC System total response time of 58 seconds (Ref. 3), includes signal delay, DG startup (for loss of offsite power), and service water pump startup times.

Containment cooling performance for post accident conditions is given in Reference 3. The result of the analysis is that two CS trains and three RCFCs can provide 100% of the required peak cooling capacity during the post accident conditions.

The CS System and the RCFC System satisfy Criterion 3 of the NRC Policy Statement.

LCO

During a DBA, a minimum of two CS trains and three RCFCs are required to maintain the containment peak pressure and temperature below the design limits. In addition, one CS train is also required to remove iodine from the containment atmosphere and maintain concentrations below those assumed in the safety analysis. To ensure that these requirements are met, three CS trains and five RCFCS must be OPERABLE. Therefore, in the event of an accident, at least two CS trains and three RCFCs are available, assuming the worst case single active failure occurs.

Each CS System includes a spray pump, spray headers, nozzles, valves, piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWST upon an ESF actuation signal. Containment spray during the recirculation phase is accomplished by aligning an RHR pump to the spray header of one motor driven CS pump. Two spray headers are required to remain OPERABLE to assure the system capability to provide containment spray during the recirculation phase following a DBA. Two headers are required to ensure that one header will be available after a postulated single failure. An OPERABLE header includes the piping from the RHR System to the inlet of the spray header and to the spray nozzles. In addition, the necessary valves and other controls to assure the capability to align the RHR System to the recirculation mode and provide the design spray flow to the containment atmosphere are required. The

(continued)

BASES

LCO (continued)

plant design includes two recirculation headers, as such, both headers are required to remain OPERABLE during operations in the applicable MODES.

Each RCFC includes cooling coils, dampers, fans, instruments, and controls to ensure an OPERABLE flow path.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment and an increase in containment pressure and temperature requiring the operation of the CS trains and RCFCs.

In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Thus, the CS System and the RCFCs are not required to be OPERABLE in MODES 5 and 6.

ACTIONS

A.1

With one CS train inoperable, the inoperable CS train must be restored to OPERABLE status within 72 hours. In this Condition, the remaining OPERABLE CS trains and RCFCs are adequate to perform the iodine removal and containment cooling functions. The 72 hour Completion Time takes into account the redundant heat removal capability afforded by the CS System and RCFC System, reasonable time for repairs, and low probability of a DBA occurring during this period.

The 14 day portion of the Completion Time for Required Action A.1 is based upon engineering judgment. It takes into account the low probability of coincident entry into two Conditions in this Specification coupled with the low probability of an accident occurring during this time.

B.1

With one CS recirculation header inoperable, the inoperable CS header must be restored to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE CS recirculation header performs the containment cooling function. The 7 day Completion Time takes into account the redundant heat

(continued)

BASES

ACTIONS

B.1 (continued)

removal capability afforded by the RCFCs, reasonable time for repairs, and low probability of a DBA occurring during this period.

The 14 day portion of the Completion Time for Required Action B.1 is based upon engineering judgment. It takes into account the low probability of coincident entry into two Conditions in this Specification coupled with the low probability of an accident occurring during this time.

C.1

With one RCFC inoperable, the inoperable RCFC must be restored to OPERABLE status within 7 days. In this condition, the CS trains and the remaining RCFCs provide at least 100% of the heat removal needs. The 7 day Completion Time was developed taking into account the redundant heat removal capabilities afforded by combinations of the CS System and RCFC System and the low probability of a DBA occurring during this period.

The 14 day portion of the Completion Time for Required Action C.1 is based upon engineering judgment. It takes into account the low probability of coincident entry into two Conditions in this Specification coupled with the low probability of an accident occurring during this time.

D.1 and D.2

If the inoperable CS train, RCFC or CS recirculation header cannot be restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within 6 hours and in MODE 5 within 84 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems. The extended interval to reach MODE 5 allows additional time for attempting restoration of the CS train, RCFC or CS recirculation header and is reasonable when considering the driving force for a release

(continued)

BASES

ACTIONS

D.1 and D.2 (continued)

of radioactive material from the Reactor Coolant System is reduced in the lower temperature region of MODE 3.

E.1

With two RCFCs inoperable, one RCFC must be restored to OPERABLE status within 72 hours. In this condition, the CS trains and remaining RCFCs are still capable of providing at least 100% of the heat removal needs after an accident, however, the total effectiveness of the heat removal capability has been reduced. The 72 hour Completion Time was developed taking into account the redundant heat removal capabilities afforded by combinations of the CS System and RCFC System and the low probability of a DBA occurring during this period.

F.1 and F.2

If the Required Action and associated Completion Time of Condition E of this LCO are not met, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within 6 hours and in MODE 5 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.

SURVEILLANCE REQUIREMENTS

SR 3.6.6.1

Operating each RCFC at low speed for ≥ 15 minutes ensures that all fan units 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. The 31 day Frequency was developed considering the known reliability of the fan units and controls, the redundancy available, and the low probability of significant degradation of the RCFCs occurring between surveillances. It has also been shown to be acceptable through operating experience.

(continued)

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.6.2

Verifying the SW cooling flow rate to each RCFC unit is ≥ ~~1600~~1500 gpm under postulated post-accident conditions provides assurance that the design flow rate assumed in the safety analyses will be achieved (Ref. 3). This is done by verifying that the current SW System configuration, including component and valve lineup and number of OPERABLE SW pumps, is within the assumptions of the SW analysis (Ref.5) performed to verify SW System design basis. The BASES for LCO 3.7.8 contain the specific SW System configurations for the number of OPERABLE SW pumps, both assuming and in the absence of a single failure.

If SW System configuration is determined to meet the requirements of LCO 3.7.8, Condition D, then SR 3.6.6.2 is considered to be met. If SR 3.6.6.2 cannot be met due to a failure to meet LCO 3.7.8, Condition D, then so long as LCO 3.7.8, Required Action D.1 is met, SR 3.6.6.2 can be considered met. If LCO 3.7.8, Required Action D.1 is not met, then SR 3.6.6.2 is not met and the RCFC units are beyond their design basis. In this case LCO 3.0.3 applies. This is equivalent to SW to all RCFC units being inoperable, and entering LCO 3.0.3 for LCO 3.7.8.

The Frequency was developed considering the known reliability of the cooling water system, the redundancy available, and the low probability of a significant degradation of flow occurring between surveillances.

SR 3.6.6.3

Verifying that the diesel driven containment spray pump fuel oil day tank contains greater than or equal to 46 gallons of fuel oil provides assurance that adequate fuel is available to power the diesel driven containment spray pump for the length of time (approximately 77 minutes) it is credited when operating in response to a design basis accident and includes a small margin for calculation conservatism (Ref. 3). The 31 day Frequency is based on the available alarm indication provided in the control room of a low level in the tank.

SR 3.6.6.4

(continued)

BASES

Specification 5.5.11, "Diesel Fuel Oil Testing Program," specifies the required testing of both new fuel oil and stored fuel oil in accordance with the applicable ASTM Standards. Since the diesel driven CS pump fuel oil tank is typically filled from an OPERABLE emergency diesel generator storage tank, the performance of new fuel oil testing is not required. This is because the fuel oil has already been analyzed before being added to the emergency diesel generator storage tanks. However, if fuel oil in an emergency diesel generator storage tank has been determined to not meet the requirements of Specification 3.8.3, "Diesel Fuel Oil and Starting Air," after it has been added to the diesel driven CS pump fuel oil tank, or the fuel oil to be added is from a source other than an OPERABLE emergency diesel generator storage tank, then the new fuel oil must be tested in accordance with the Diesel Fuel Oil Testing Program.

(continued)

BASES

SURVEILLANCE REQUIREMENTS

SR 3.6.6.4 (continued)

Stored fuel oil degradation shows up as an increase in particulate, due mostly to oxidation. The presence of particulate does not mean the fuel oil will not burn properly in a diesel engine. However, the particulate can cause fouling of filters and fuel oil injection equipment which can cause engine failure.

Stored fuel oil particulate concentrations should be determined in accordance with ASTM D2276, Method A-2 or Method A-3. This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing.

The Frequency of 31 days for testing the stored fuel considers fuel oil degradation trends which indicate that particulate concentration is unlikely to change significantly during this period.

SR 3.6.6.5 and SR 3.6.6.6

These SRs require verification that each automatic CS valve actuates to its correct position and that each CS spray pump starts upon receipt of an actual or simulated actuation of a containment High-High pressure signal coincident with a SI signal. This surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The 18 month Frequency is based on the need to perform these Surveillances under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillances were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillances when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.6.7

This SR requires verification that each RCFC actuates upon receipt of an actual or simulated safety injection signal. The 18 month Frequency is based on engineering judgment and

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BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.6.7

on operating experience which has shown that these components usually pass the surveillances when performed at

the 18 month frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.6.8

Verifying the correct alignment of the RCFC accident dampers provides assurance that the proper flow path will exist for post accident RCFC operation. This SR does not apply to dampers that are fixed or otherwise secured in position, since these were verified to be in the correct position prior to being secured. This SR does not require any testing or damper manipulation. Rather it involves verification, through a system walkdown, that dampers capable of being mispositioned are in the correct position. The 18 month Frequency is based on the need to access the RCFCs and on operating experience which has shown these that these components usually pass this surveillance when performed at the 18 month Frequency.

SR 3.6.6.9

With the spray header drained of any solution, low pressure air or smoke can be blown through test connections. This SR ensures that each spray nozzle is unobstructed and provides assurance that spray coverage of the containment during an accident is not degraded. Due to the passive design of the nozzle, a test at 10 year intervals is considered adequate to detect obstruction of the nozzles.

REFERENCES

1. UFSAR, Section 6.5.2.
2. UFSAR, Section 6.2.2.
3. UFSAR, Section 15.6.
4. UFSAR, Section 15.0.
5. Zion Station Updated SW Hydraulic Model Calculation: D22S-B-00220-525, Rev. 1.

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SURVEILLANCE REQUIREMENTS

SURVEILLANCE		FREQUENCY
SR 3.6.6.1	Operate each RCFC at low speed for ≥ 15 minutes.	31 days
SR 3.6.6.2	Verify each RCFC cooling water flow rate would be ≥ 1500 gpm under accident conditions.	31 days
SR 3.6.6.3	Verify the diesel driven CS pump fuel oil day tank contains ≥ 46 gallons of fuel oil.	31 days
SR 3.6.6.4	Verify the diesel driven CS pump fuel oil properties are tested in accordance with, and maintained within the limits of the Diesel Fuel Oil Testing Program.	In accordance with the Diesel Fuel Oil Testing Program
SR 3.6.6.5	Verify each automatic CS valve in the flow path that is not locked, sealed, or otherwise secured in position actuates to the correct position on an actual or simulated actuation signal.	18 months
SR 3.6.6.6	Verify each CS pump starts automatically on an actual or simulated actuation signal.	18 months
SR 3.6.6.7	Verify each RCFC starts automatically on an actual or simulated actuation signal.	18 months

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SURVEILLANCE		FREQUENCY
SR 3.6.6.8	Verify the Accident Inlet, Accident Outlet, and Normal Inlet RCFC dampers that are not locked, sealed, or otherwise secured in their accident position, are in the accident position.	18 months
SR 3.6.6.9	Verify each spray nozzle is unobstructed.	10 years

B 3.6 CONTAINMENT SYSTEMS

B 3.6.6 Containment Spray (CS) and Reactor Containment Fan Cooler (RCFC) Systems

BASES

BACKGROUND

The CS and RCFC Systems provide containment atmosphere cooling to limit post accident pressure and temperature in containment to less than the design values. Reduction of containment pressure and the iodine removal capability of the spray reduces the release of fission product radioactivity from containment to the environment in the event of a Design Basis Accident (DBA).

The CS and RCFC Systems are Engineered Safety Feature (ESF) Systems. They are designed to ensure that the heat removal capability required during the post accident period can be attained. The CS and RCFC Systems provide redundant methods to limit and maintain post accident conditions to less than the containment design values.

Containment Spray System

The CS System consists of three separate trains of equal capacity, two CS trains in conjunction with three RCFCs can provide the required flow for containment pressure control (Ref. 1). Each train includes a containment spray pump, spray headers, nozzles, valves, and piping. Two trains are powered from separate ESF buses. The third train utilizes a separate ESF bus for valve and control power requirements and a dedicated diesel engine to supply motive force to the pump. The refueling water storage tank (RWST) supplies borated water to the CS System during the injection phase of operation. In the recirculation mode of operation, one Residual Heat Removal (RHR) pump is aligned from the containment recirculation sump to the spray header of one motor driven CS pump to provide long term containment cooling. Iodine removal by the CS system is not credited in the analysis during the recirculation mode of operation.

The CS System provides a spray of borated water mixed with sodium hydroxide (NaOH) from the spray additive tank into the upper regions of containment to reduce the containment pressure and temperature and to reduce fission products from the containment atmosphere during a DBA. The RWST solution

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BACKGROUND (continued)

temperature is an important factor in determining the heat removal capability of the CS System during the injection phase. In the recirculation mode of operation, heat is removed from the containment recirculation sump water by the RHR coolers. Each train of the CS System provides adequate spray coverage to meet the system design requirements for containment heat removal.

The Spray Additive System injects an NaOH solution into the spray. The resulting alkaline pH of the spray enhances the ability of the spray to scavenge fission products from the containment atmosphere. The NaOH added in the spray also ensures an alkaline pH for the solution in the containment recirculation sump. The alkaline pH of the containment recirculation sump water minimizes the evolution of iodine and minimizes the occurrence of chloride and caustic stress corrosion on mechanical systems and components exposed to the fluid. One CS train can deliver enough NaOH to form the desired solution in the containment recirculation sump when combined with the inventory of the RWST and the spilled reactor coolant.

The CS System is actuated either automatically by a containment High-High pressure signal coincident with a Safety Injection (SI) signal, or manually. An automatic actuation opens the CS pump discharge valves, opens the spray additive tank outlet valves, starts the three CS pumps, and begins the injection phase. A manual actuation of the CS System requires the operator to actuate two Phase B push buttons and either have an SI signal present or activate a manual SI switch to begin the same sequence. The injection phase continues until an RWST low level alarm is received. The low level alarm for the RWST alerts the operator to initiate changeover from injection to recirculation by a series of valve realignments. When the RWST low level alarm is received, two of the CS pumps and both RHR pumps are stopped. An RHR pump can then be aligned to the CS recirculation header and restarted in order to maintain an equilibrium temperature between the containment atmosphere and the recirculated sump water. The remaining CS pump continues to run until the RWST is empty. Operation of an RHR pump in the CS recirculation mode is controlled by the operator in accordance with the emergency operating procedures.

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BASES

BACKGROUND (continued)

Reactor Containment Fan Cooling System

Five RCFCs are provided (Ref. 2), three of which in conjunction with two CS trains have sufficient capacity to supply 100% of the design cooling requirement. Each fan unit is supplied with cooling water from the Service Water (SW) System at a pressure ≥ 47 psig. Air is drawn into the coolers through the fan and discharged to the lower areas of containment.

During normal operation, the fans are operated at high speed with SW supplied to the cooling coils. The RCFCs, operating in conjunction with the Containment Ventilation System, are designed to limit the ambient containment air temperature during normal unit operation to less than the limit specified in LCO 3.6.5, "Containment Air Temperature." This temperature limitation ensures that the containment temperature does not exceed the initial temperature conditions assumed for the DBAs.

In post accident operation following an actuation signal, the RCFCs are designed to start automatically in low speed if not already running. If running in high (normal) speed, the fans automatically shift to low speed. The fans are operated at the lower speed during accident conditions to prevent motor overload from the higher mass atmosphere. The temperature of the SW is an important factor in the heat removal capability of the fan units.

APPLICABLE SAFETY ANALYSES

The CS System and RCFC System limit the temperature and pressure that could be experienced in containment following a DBA. The limiting DBAs considered are the Loss of Coolant Accident (LOCA) and the Main Steam Line Break (MSLB). The LOCA and MSLB are analyzed using computer codes designed to predict the resultant containment pressure and temperature transients. No two DBAs are assumed to occur simultaneously or consecutively. The postulated DBAs are analyzed with regard to ESF System response. The basis for the safeguards performance is the loss of two fan coolers and one spray pump. This failure is more severe than the usual worst case single failure (i.e.; the loss of one emergency diesel generator), since the worst case single failure would limit the available water flow to the core and thus limit the mass and energy flow from the reactor coolant system to the

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

containment during the reflood period. For an MSLB, offsite power is conservatively assumed available for purposes of determining the mass and energy release to the containment. The assumed worst case failure is a main steam check valve. The safeguards performance (two CS trains and three RCFCs) is consistent with the LOCA analysis.

The analysis and evaluation show that the highest peak containment pressure and the highest peak containment temperature experienced during a LOCA or MSLB meet the intent of the design basis. (See the Bases for LCO 3.6.4, "Containment Pressure," and LCO 3.6.5, "Containment Air Temperature," for a detailed discussion.) The LOCA containment analysis assumes a unit specific power level of 106.4%, two CS trains and three RCFCs operating, and initial (pre-accident) containment conditions of 120°F and 1.0 psig. The MSLB is analyzed at 102% and 0% power and assumes an initial containment pressure of -1.5 psig which tends to maximize the peak temperature. The analyses also assume a response time delayed initiation to provide conservative peak calculated containment pressure and temperature responses.

For certain aspects of transient accident analyses, maximizing the calculated containment pressure is not conservative. In particular, the effectiveness of the Emergency Core Cooling System during the core reflood phase of a LOCA analysis increases with increasing containment backpressure. For these calculations, the containment backpressure is calculated in a manner designed to conservatively minimize, rather than maximize, the calculated transient containment pressures in accordance with 10 CFR 50, Appendix K.

The modeled CS System actuation from the containment analysis is based on a response time associated with exceeding the containment High-High pressure setpoint to achieving full flow through the containment spray nozzles. The CS System total response time of 110 seconds includes diesel generator (DG) startup (for loss of offsite power), block loading of equipment, CS pump startup, and spray line filling (Ref. 3).

(continued)

BASES

APPLICABLE SAFETY ANALYSES (continued)

The modeled RCFC System actuation from the containment analysis is based upon a response time associated with exceeding the containment High pressure setpoint to achieving full RCFC air and safety grade cooling water flow. The RCFC System total response time of 58 seconds (Ref. 3), includes signal delay, DG startup (for loss of offsite power), and service water pump startup times.

Containment cooling performance for post accident conditions is given in Reference 3. The result of the analysis is that two CS trains and three RCFCs can provide 100% of the required peak cooling capacity during the post accident conditions.

The CS System and the RCFC System satisfy Criterion 3 of the NRC Policy Statement.

LCO

During a DBA, a minimum of two CS trains and three RCFCs are required to maintain the containment peak pressure and temperature below the design limits. In addition, one CS train is also required to remove iodine from the containment atmosphere and maintain concentrations below those assumed in the safety analysis. To ensure that these requirements are met, three CS trains and five RCFCS must be OPERABLE. Therefore, in the event of an accident, at least two CS trains and three RCFCs are available, assuming the worst case single active failure occurs.

Each CS System includes a spray pump, spray headers, nozzles, valves, piping, instruments, and controls to ensure an OPERABLE flow path capable of taking suction from the RWST upon an ESF actuation signal. Containment spray during the recirculation phase is accomplished by aligning an RHR pump to the spray header of one motor driven CS pump. Two spray headers are required to remain OPERABLE to assure the system capability to provide containment spray during the recirculation phase following a DBA. Two headers are required to ensure that one header will be available after a postulated single failure. An OPERABLE header includes the piping from the RHR System to the inlet of the spray header and to the spray nozzles. In addition, the necessary valves and other controls to assure the capability to align the RHR System to the recirculation mode and provide the design spray flow to the containment atmosphere are required. The

(continued)

BASES

LCO (continued)

plant design includes two recirculation headers, as such, both headers are required to remain OPERABLE during operations in the applicable MODES.

Each RCFC includes cooling coils, dampers, fans, instruments, and controls to ensure an OPERABLE flow path.

APPLICABILITY

In MODES 1, 2, 3, and 4, a DBA could cause a release of radioactive material to containment and an increase in containment pressure and temperature requiring the operation of the CS trains and RCFCs.

In MODES 5 and 6, the probability and consequences of these events are reduced due to the pressure and temperature limitations of these MODES. Thus, the CS System and the RCFCs are not required to be OPERABLE in MODES 5 and 6.

ACTIONS

A.1

With one CS train inoperable, the inoperable CS train must be restored to OPERABLE status within 72 hours. In this Condition, the remaining OPERABLE CS trains and RCFCs are adequate to perform the iodine removal and containment cooling functions. The 72 hour Completion Time takes into account the redundant heat removal capability afforded by the CS System and RCFC System, reasonable time for repairs, and low probability of a DBA occurring during this period.

The 14 day portion of the Completion Time for Required Action A.1 is based upon engineering judgment. It takes into account the low probability of coincident entry into two Conditions in this Specification coupled with the low probability of an accident occurring during this time.

B.1

With one CS recirculation header inoperable, the inoperable CS header must be restored to OPERABLE status within 7 days. In this Condition, the remaining OPERABLE CS recirculation header performs the containment cooling function. The 7 day Completion Time takes into account the redundant heat

(continued)

BASES

ACTIONS

B.1 (continued)

removal capability afforded by the RCFCs, reasonable time for repairs, and low probability of a DBA occurring during this period.

The 14 day portion of the Completion Time for Required Action B.1 is based upon engineering judgment. It takes into account the low probability of coincident entry into two Conditions in this Specification coupled with the low probability of an accident occurring during this time.

C.1

With one RCFC inoperable, the inoperable RCFC must be restored to OPERABLE status within 7 days. In this condition, the CS trains and the remaining RCFCs provide at least 100% of the heat removal needs. The 7 day Completion Time was developed taking into account the redundant heat removal capabilities afforded by combinations of the CS System and RCFC System and the low probability of a DBA occurring during this period.

The 14 day portion of the Completion Time for Required Action C.1 is based upon engineering judgment. It takes into account the low probability of coincident entry into two Conditions in this Specification coupled with the low probability of an accident occurring during this time.

D.1 and D.2

If the inoperable CS train, RCFC or CS recirculation header cannot be restored to OPERABLE status within the required Completion Time, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within 6 hours and in MODE 5 within 84 hours. The allowed Completion Time of 6 hours is reasonable, based on operating experience, to reach MODE 3 from full power conditions in an orderly manner and without challenging plant systems. The extended interval to reach MODE 5 allows additional time for attempting restoration of the CS train, RCFC or CS recirculation header and is reasonable when considering the driving force for a release

(continued)

ACTIONS

D.1 and D.2 (continued)

of radioactive material from the Reactor Coolant System is reduced in the lower temperature region of MODE 3.

E.1

With two RCFCs inoperable, one RCFC must be restored to OPERABLE status within 72 hours. In this condition, the CS trains and remaining RCFCs are still capable of providing at least 100% of the heat removal needs after an accident, however, the total effectiveness of the heat removal capability has been reduced. The 72 hour Completion Time was developed taking into account the redundant heat removal capabilities afforded by combinations of the CS System and RCFC System and the low probability of a DBA occurring during this period.

F.1 and F.2

If the Required Action and associated Completion Time of Condition E of this LCO are not met, the unit must be placed in a MODE in which the LCO does not apply. This is done by placing the unit in at least MODE 3 within 6 hours and in MODE 5 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.

SURVEILLANCE REQUIREMENTS

SR 3.6.6.1

Operating each RCFC at low speed for ≥ 15 minutes ensures that all fan units 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. The 31 day Frequency was developed considering the known reliability of the fan units and controls, the redundancy available, and the low probability of significant degradation of the RCFCs occurring between surveillances. It has also been shown to be acceptable through operating experience.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.6.2

Verifying the SW cooling flow rate to each RCFC unit is ≥ 1500 gpm under postulated post-accident conditions provides assurance that the design flow rate assumed in the safety analyses will be achieved (Ref. 3). This is done by verifying that the current SW System configuration, including component and valve lineup and number of OPERABLE SW pumps, is within the assumptions of the SW analysis (Ref.5) performeu to verify SW System design basis. The BASES for LCO 3.7.8 contain the specific SW System configurations for the number of OPERABLE SW pumps, both assuming and in the absence of a single failure.

If SW System configuration is determined to meet the requirements of LCO 3.7.8, Condition D, then SR 3.6.6.2 is considered to be met. If SR 3.6.6.2 cannot be met due to a failure to meet LCO 3.7.8, Condition D, then so long as LCO 3.7.8, Required Action D.1 is met, SR 3.6.6.2 can be considered met. If LCO 3.7.8, Required Action D.1 is not met, then SR 3.6.6.2 is not met and the RCFC units are beyond their design basis. In this case LCO 3.0.3 applies. This is equivalent to SW to all RCFC units being inoperable, and entering LCO 3.0.3 for LCO 3.7.8.

The Frequency was developed considering the known reliability of the cooling water system, the redundancy available, and the low probability of a significant degradation of flow occurring between surveillances.

SR 3.6.6.3

Verifying that the diesel driven containment spray pump fuel oil day tank contains greater than or equal to 46 gallons of fuel oil provides assurance that adequate fuel is available to power the diesel driven containment spray pump for the length of time (approximately 77 minutes) it is credited when operating in response to a design basis accident and includes a small margin for calculation conservatism (Ref. 3). The 31 day Frequency is based on the available alarm indication provided in the control room of a low level in the tank.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.6.4

Specification 5.5.11, "Diesel Fuel Oil Testing Program," specifies the required testing of both new fuel oil and stored fuel oil in accordance with the applicable ASTM Standards. Since the diesel driven CS pump fuel oil tank is typically filled from an OPERABLE emergency diesel generator storage tank, the performance of new fuel oil testing is not required. This is because the fuel oil has already been analyzed before being added to the emergency diesel generator storage tanks. However, if fuel oil in an emergency diesel generator storage tank has been determined to not meet the requirements of Specification 3.8.3, "Diesel Fuel Oil and Starting Air," after it has been added to the diesel driven CS pump fuel oil tank, or the fuel oil to be added is from a source other than an OPERABLE emergency diesel generator storage tank, then the new fuel oil must be tested in accordance with the Diesel Fuel Oil Testing Program.

Stored fuel oil degradation shows up as an increase in particulate, due mostly to oxidation. The presence of particulate does not mean the fuel oil will not burn properly in a diesel engine. However, the particulate can cause fouling of filters and fuel oil injection equipment which can cause engine failure.

Stored fuel oil particulate concentrations should be determined in accordance with ASTM D2276, Method A-2 or Method A-3. This method involves a gravimetric determination of total particulate concentration in the fuel oil and has a limit of 10 mg/l. It is acceptable to obtain a field sample for subsequent laboratory testing in lieu of field testing.

The Frequency of 31 days for testing the stored fuel considers fuel oil degradation trends which indicate that particulate concentration is unlikely to change significantly during this period.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.6.5 and SR 3.6.6.6

These SRs require verification that each automatic CS valve actuates to its correct position and that each CS spray pump starts upon receipt of an actual or simulated actuation of a containment High-High pressure signal coincident with a SI signal. This surveillance is not required for valves that are locked, sealed, or otherwise secured in the required position under administrative controls. The 18 month Frequency is based on the need to perform these Surveillances under the conditions that apply during a plant outage and the potential for an unplanned transient if the Surveillances were performed with the reactor at power. Operating experience has shown that these components usually pass the Surveillances when performed at the 18 month Frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.6.7

This SR requires verification that each RCFC actuates upon receipt of an actual or simulated safety injection signal. The 18 month Frequency is based on engineering judgment and on operating experience which has shown that these components usually pass the surveillances when performed at the 18 month frequency. Therefore, the Frequency was concluded to be acceptable from a reliability standpoint.

SR 3.6.6.8

Verifying the correct alignment of the RCFC accident dampers provides assurance that the proper flow path will exist for post accident RCFC operation. This SR does not apply to dampers that are fixed or otherwise secured in position, since these were verified to be in the correct position prior to being secured. This SR does not require any testing or damper manipulation. Rather it involves verification, through a system walkdown, that dampers capable of being mispositioned are in the correct position. The 18 month Frequency is based on the need to access the RCFCs and on operating experience which has shown these that these components usually pass this surveillance when performed at the 18 month Frequency.

(continued)

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.6.9

With the spray header drained of any solution, low pressure air or smoke can be blown through test connections. This SR ensures that each spray nozzle is unobstructed and provides assurance that spray coverage of the containment during an accident is not degraded. Due to the passive design of the nozzle, a test at 10 year intervals is considered adequate to detect obstruction of the nozzles.

REFERENCES

1. UFSAR, Section 6.5.2.
2. UFSAR, Section 6.2.2.
3. UFSAR, Section 15.6.
4. UFSAR, Section 15.0.
5. Zion Station Updated SW Hydraulic Model Calculation: D22S-B-00220-525, Rev. 1.

DOC CHANGES

NSHC	NO.	DISCUSSION
A.	90.	In CTS 4.10.5, the Surveillance Frequency for the verification of containment pressure has been specified as once per "12 hours" instead of the "once per shift." At Zion Station, the normal shift is 12 hours. As a result, this change is editorial in nature.
L-26.	91.	In CTS 4.10.6, the Surveillance Frequency for the verification of containment temperature has been revised to once per "24 hours" instead of "once per shift." The 24 hour Frequency is considered acceptable based on the observed slow rates of temperature increase within containment as a result of environmental heat sources (due to the large volume of containment). In addition, other indications are available in the control room to alert the operator to an abnormal containment temperature condition.
	92.	~~Deleted~~ References to Appendix J have been changed to reference the Containment Leakage Rate Testing Program following implementation of 10 CFR 50, Appendix J, Option B.
L-28	93.	This change to the requirements of the CTS 4.9.3.A.2 exempts certain automatic containment isolation valves from the 18 month surveillance testing that would demonstrate satisfactory operation. The valves are exempted because they are locked, sealed, or otherwise secured in the required position under administrative controls. These valves do not reposition in order to fulfill their safety function, and are secured in their required position to fulfill their accident function. Therefore no automatic isolation is required. This exemption is in accordance with NUREG-1431, Rev 1.
L-29	94.	This change to the requirements of CTS 4.5.1.b.2 eliminates the 18 month surveillance for those required (Accident Inlet, Accident Outlet, and Normal Inlet) dampers that have been secured in the accident position. It would be superfluous to verify the position of such dampers, and any alteration which would allow the dampers to be repositioned would constitute a change to the facility design.
L-A	95.	~~SR 4.5.1.a.2, verification of SW flow to the RCFC Coolers, has been relocated under the Zion ITS. It has been replaced by performance of ITS SR 3.7.8.1.~~ SR 4.5.1.a.2, verification of SW flow to the RCFC coolers, has been revised under the Zion ITS. The flow verification (SR 3.6.6.2) now verifies that the SW System configuration is within the assumptions of the SW System hydraulic flow analysis that was performed to verify SW System design basis.

NSHC NO. DISCUSSION

~~ITS SR 3.7.8.1 is a valve lineup verification for SW System alignment. It verifies that for a given SW pump and component alignment, accident SW flow is maintained to all SW accident loads, under limiting DBA conditions.~~

Specifically, SW flow of 1500 gpm was verified to the RCFC coolers by performance of a flow analysis, given a minimum SW component alignment. The SW System alignment assumptions of the flow analysis are also verified as being met by performance of SR 3.7.8.1. Due to SW System configuration and operational requirements, performing a flow verification using normal SW System alignment does not provide verification of SW flow to the RCFC units in an accident. Verification ~~on a weekly basis~~ that the SW alignment is within the bounds of the assumptions of the flow analysis is equivalent to realigning SW System configuration to accident conditions and measuring flow. ~~In either Surveillance Requirementmethod, minimum SW flow to SW components under accident conditions is verified. Performing this verification on a weekly basis by performing SR 3.7.8.1 is a more restrictive surveillance requirement than SR 3.6.6.2.~~

ITS SR 3.7.8.1 is a valve lineup verification for SW System alignment. It verifies that for a given SW pump and component alignment, accident SW flow is maintained to all SW accident loads, under limiting DBA conditions. SR 3.7.8.1 will be performed weekly, with an acceptance criteria that ensures SW flow meets accident assumptions. ~~within 8 hours~~, ~~or~~If the SW system is outside its design basis, ~~and~~ LCO 3.0.3 applies~~must be met~~. This is equivalent to having no RCFCs operable in LCO 3 6.6.

CLEAN DOC

NSHC	NO.	DISCUSSION
A.	90.	In CTS 4.10.5, the Surveillance Frequency for the verification of containment pressure has been specified as once per "12 hours" instead of the "once per shift." At Zion Station, the normal shift is 12 hours. As a result, this change is editorial in nature.
L-26.	91.	In CTS 4.10.6, the Surveillance Frequency for the verification of containment temperature has been revised to once per "24 hours" instead of "once per shift." The 24 hour Frequency is considered acceptable based on the observed slow rates of temperature increase within containment as a result of environmental heat sources (due to the large volume of containment). In addition, other indications are available in the control room to alert the operator to an abnormal containment temperature condition.
	92.	References to Appendix J have been changed to reference the Containment Leakage Rate Testing Program following implementation of 10 CFR 50, Appendix J, Option B.
L-28	93.	This change to the requirements of the CTS 4.9.3.A.2 exempts certain automatic containment isolation valves from the 18 month surveillance testing that would demonstrate satisfactory operation. The valves are exempted because they are locked, sealed, or otherwise secured in the required position under administrative controls. These valves do not reposition in order to fulfill their safety function, and are secured in their required position to fulfill their accident function. Therefore no automatic isolation is required. This exemption is in accordance with NUREG-1431, Rev 1.
L-29	94.	This change to the requirements of CTS 4.5.1.b.2 eliminates the 18 month surveillance for those required (Accident Inlet, Accident Outlet, and Normal Inlet) dampers that have been secured in the accident position. It would be superfluous to verify the position of such dampers, and any alteration which would allow the dampers to be repositioned would constitute a change to the facility design.
L-A	95.	SR 4.5.1.a.2, verification of SW flow to the RCFC coolers, has been revised under the Zion ITS. The flow verification (SR 3.6.6.2) now verifies that the SW System configuration is within the assumptions of the SW System hydraulic flow analysis that was performed to verify SW System design basis. Specifically, SW flow of 1500 gpm was verified to the RCFC coolers by performance of a flow analysis, given a minimum SW component alignment. The SW System alignment assumptions of the flow

NSHC NO. DISCUSSION

analysis are also verified as being met by performance of SR 3.7.8.1. Due to SW System configuration and operational requirements, performing a flow verification using normal SW System alignment does not provide verification of SW flow to the RCFC units in an accident. Verification that the SW alignment is within the bounds of the assumptions of the flow analysis is equivalent to realigning SW System configuration to accident conditions and measuring flow.

ITS SR 3.7.8.1 is a valve lineup verification for SW System alignment. It verifies that for a given SW pump and component alignment, accident SW flow is maintained to all SW accident loads, under limiting DBA conditions. SR 3.7.8.1 will be performed weekly, with an acceptance criteria that ensures SW flow meets accident assumptions. If the SW system is outside its design basis, LCO 3.0.3 applies. This is equivalent to having no RCFCs operable in LCO 3.6.6.

NUREG MARKUPS

SURVEILLANCE REQUIREMENTS (continued)

SURVEILLANCE		FREQUENCY
SR 3.6.6A.2	Operate each [required] containment cooling train fan unit for ≥ 15 minutes.	31 days
SR 3.6.6A.3	Verify each [required] containment cooling train cooling water flow rate is ≥ [700] gpm.	31 days
SR 3.6.6A.4	Verify each containment spray pump's developed head at the flow test point is greater than or equal to the required developed head.	In accordance with the Inservice Testing Program
SR 3.6.6A.5	Verify each automatic containment spray valve in the flow path actuates to the correct position on an actual or simulated actuation signal.	[18] months
SR 3.6.6A.6	Verify each containment spray pump starts automatically on an actual or simulated actuation signal.	[18] months
SR 3.6.6A.7	Verify each [required] containment cooling train starts automatically on an actual or simulated actuation signal.	[18] months

(continued)

INSERT "B"

INSERT "C"

BASES

SURVEILLANCE REQUIREMENTS (continued)

SR 3.6.6A.2

Operating each [required] containment cooling train fan unit for ≥ 15 minutes ensures that all trains 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. The 31 day Frequency was developed considering the known reliability of the fan units and controls, the two train redundancy available, and the low probability of significant degradation of the containment cooling train occurring between surveillances. It has also been shown to be acceptable through operating experience.

SR 3.6.6A.3

Verifying that each [required] containment cooling train ESW cooling flow rate to each cooling unit is ≥ [700] gpm provides assurance that the design flow rate assumed in the safety analyses will be achieved (Ref. 3). The Frequency was developed considering the known reliability of the Cooling Water System, the two train redundancy available, and the low probability of a significant degradation of flow occurring between surveillances.

SR 3.6.6A.4

Verifying each containment spray pump's developed head at the flow test point is greater than or equal to the required developed head ensures that spray pump performance has not degraded during the cycle. Flow and differential pressure are normal tests of centrifugal pump performance required by Section XI of the ASME Code (Ref. 8). Since the containment spray pumps cannot be tested with flow through the spray headers, they are tested on recirculation flow. This test confirms one point on the pump design curve and is indicative of overall performance. Such inservice inspections confirm component OPERABILITY, trend performance, and detect incipient failures by abnormal performance. The Frequency of the SR is in accordance with the Inservice Testing Program.

(continued)

INSERT "I"

Verifying the SW cooling flow rate to each RCFC unit is ≥ 1500 gpm under postulated post-accident conditions provides assurance that the design flow rate assumed in the safety analyses will be achieved (Ref. 3). This is done by verifying that the current SW System configuration, including component and valve lineup and number of OPERABLE SW pumps, is within the assumptions of the SW analysis (Ref.5) performed to verify SW System design basis. The BASES for LCO 3.7.8 contain the specific SW System configurations for the number of OPERABLE SW pumps, both assuming and in the absence of a single failure.

If SW System configuration is determined to meet the requirements of LCO 3.7.8, Condition D, then SR 3.6.6.2 is considered to be met. If SR 3.6.6.2 cannot be met due to a failure to meet LCO 3.7.8, Condition D, then so long as LCO 3.7.8, Required Action D.1 is met, SR 3.6.6.2 can be considered met. If LCO 3.7.8, Required Action D.1 is not met, then SR 3.6.6.2 is not met and the RCFC units are beyond their design basis. In this case LCO 3.0.3 applies. This is equivalent to SW to all RCFC units being inoperable, and entering LCO 3.0.3 for LCO 3.7.8.

The Frequency was developed considering the known reliability of the cooling water system, the redundancy available, and the low probability of a significant degradation of flow occurring between surveillances.

DOD CHANGES

CHANGE NUMBER	DISCUSSION
21.	This change to the Zion ITS eliminates the 18 month surveillance that would verify the RCFC dampers were in their accident position. The surveillance was eliminated because the dampers have been secured in the accident position. Any alteration which would allow the dampers to be repositioned would constitute a change to the facility design.
22.	This change to the Zion ITS changes NUREG-1431 SR 3.6.6A.2,to SR 3.6.6.2. ~~which has been replaced by performance of ITS SR 3.7.8.1.~~ ITS SR ~~3.7.8.1~~ 3.6.6.2 ~~is a valve lineup verification for SW alignment. It~~ verifies that for a given SW pump and component alignment, accident SW flow is maintained to RCFC units~~all SW accident loads~~, under limiting DBA conditions. This is performed monthly~~weekly~~, and is similar to SR 3.7.8.1, which is performed weekly. ~~with a requirement to ensure flow meets accident assumptions within 8 hours, or SW system is outside its design basis and LCO 3.0.3 must be met. This is equivalent to having no RCFCs operable in LCO 3.6.6.~~ Specifically, SW flow of 1500 gpm ~~is~~ was verified to the RCFC coolers by performance of a flow analysis. The assumptions of this flow analysis are verified as being met by performance of SR 3.6.6.2~~3.7.8.1~~.

CLEAN DOD

CHANGE NUMBER	DISCUSSION
21.	This change to the Zion ITS eliminates the 18 month surveillance that would verify the RCFC dampers were in their accident position. The surveillance was eliminated because the dampers have been secured in the accident position. Any alteration which would allow the dampers to be repositioned would constitute a change to the facility design.
22.	This change to the Zion ITS changes NUREG-1431 SR 3.6.6A 2,to SR 3.6.6.2. ITS SR 3.6.6.2 ve ifies that for a given SW pump and component alignment, accident SW flow is maintained to RCFC units, under limiting DBA conditions. This is performed monthly, and is similar to SR 3.7.8.1, which is performed weekly. Specifically, SW flow of 1500 gpm was verified to the RCFC coolers by performance of a flow analysis. The assumptions of this flow analysis are verified as being met by performance of SR 3.6.6.2.