

PLANT SYSTEMS

3/4.7.4 ULTIMATE HEAT SINK

LIMITING CONDITION FOR OPERATION

3.7.4 Two independent trains of ultimate heat sink cooling towers shall be OPERABLE with each train consisting of a dry cooling tower (DCT) and a wet mechanical draft cooling tower and its associated water basin with:

- a. A minimum water level in each wet tower basin of 97% (-9.86 ft MSL)
- b. An average basin water temperature of less than or equal to 95°F.
- c. Fans as required by Table 3.7-3.

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

ACTION:

- a. With one wet mechanical draft cooling tower inoperable due to low water level and/or high average water temperature, restore the wet mechanical draft cooling tower to OPERABLE status within 72 hours or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With both wet mechanical draft cooling towers inoperable due to low water level and/or high average water temperature, restore at least one wet mechanical draft cooling tower to OPERABLE status within 1 hour and restore both wet mechanical draft cooling towers to OPERABLE status within 72 hours of initial loss, otherwise be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.
- c. With the number of OPERABLE fans less than required by Table 3.7-3, restore the number of OPERABLE fans to within the requirements of Table 3.7-3 within 72 hours (except as specified in Action e.), or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- d. With the number of OPERABLE fans less than required by Table 3.7-3 on both DCT/WCT trains, restore the number of OPERABLE fans to within the requirements of Table 3.7-3 for 1 DCT/WCT train within 1 hour and comply with ACTION c. (except as specified in ACTION e.), or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

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LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

- e. With one or more DCT fan(s) within the missile protected area of a DCT inoperable and if a Tornado Watch is in effect, restore the inoperable fan(s) to OPERABLE status within 1 hour, or be in at least HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.
- f. With more than one DCT or WCT fan inoperable and the outside air temperature greater than 70°F, determine the dry bulb temperature at least once per hour. If the temperature exceeds either the dry or wet bulb limit of Table 3.7-3 for the number of fans that are inoperable, determine the wet bulb temperature and verify that the minimum fan requirements of Table 3.7-3 are satisfied.

SURVEILLANCE REQUIREMENTS

- 4.7.4. Each train of ultimate heat sink shall be determined OPERABLE:
 - a. At least once per 24 hours by verifying the average water temperature and water level to be within their limits.
 - b. At least once per 7 days, by verifying that each wet tower and dry tower fan that is not already running, starts and operates for at least 15 minutes.

TABLE 3.7-3

ULTIMATE HEAT SINK MINIMUM FAN REQUIREMENTS

<u>AMBIENT CONDITION</u>	DRY BULB $\geq 90^{\circ}\text{F}$ OR WET BULB $\geq 81^{\circ}\text{F}$	80 $^{\circ}\text{F}$ \leq DRY BULB $< 90^{\circ}\text{F}$ AND WET BULB $< 81^{\circ}\text{F}$	DRY BULB $< 80^{\circ}\text{F}$ AND WET BULB $< 76^{\circ}\text{F}$
	Fan Requirements (1)		
	14 DCT and 8 WCT	12 DCT*** and 4 WCT*	9 DCT** and 4 WCT*
	OR		
	15 DCT and 7 WCT*		

(1) All fans of a dry cooling tower section are inoperable if component cooling water is secured to that section.

* Covers in place on out-of-service fans.

** With a tornado watch in effect, at least 8 of these 9 DCT fans under the missile protected portion of the DCT shall be OPERABLE.

*** With a tornado watch in effect, all DCT fans under the missile protected portion of the DCT shall be OPERABLE.

3/4.7.4 ULTIMATE HEAT SINK

The limitations on the ultimate heat sink level, temperature, and number of fans ensure that sufficient cooling capacity is available to either (1) provide normal cooldown of the facility, or (2) to mitigate the effects of accident conditions within acceptable limits.

The limitations on minimum water level and maximum temperature are based on providing a 30-day cooling water supply to safety-related equipment without exceeding their design basis temperature and is consistent with the recommendations of Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Plants," March 1974.

3/4.7.5 FLOOD PROTECTION

The limitation on flood protection ensures that facility protective actions will be taken in the event of flood conditions. The limit of elevation 27.0 ft Mean Sea Level is based on the maximum elevation at which the levee provides protection, the nuclear plant island structure provides protection to safety-related equipment up to elevation +30 ft Mean Sea Level.

3/4.7.6 CONTROL ROOM AIR CONDITIONING SYSTEM

The OPERABILITY of the control room air conditioning system ensures that (1) the ambient air temperature does not exceed the allowable temperature for continuous duty rating for the equipment and instrumentation cooled by this system and (2) the control room will remain habitable for operations personnel during and following all credible accident conditions. The OPERABILITY of this system in conjunction with control room design provisions is based on limiting the radiation exposure to personnel occupying the control room to 5 rem of less whole body, or its equivalent. This limitation is consistent with the requirements of General Design Criterion 19 of Appendix A, 10 CFR Part 50.

Operation of the system with the heaters on for at least 10 hours continuous over a 31-day period is sufficient to reduce the buildup of moisture on the adsorbers and HEPA filters. Obtaining and analyzing charcoal samples after 720 hours of adsorber operation (since the last sample and analysis) ensures that the adsorber maintains the efficiency assumed in the safety analysis and is consistent with Regulatory Guide 1.52.

System design is such that a Control Room Air Handling Unit and Emergency Filtration Unit in opposite trains can be credited for system operability.* In addition, the function of the heating coils in each Control Room Air Handling train is to provide personnel comfort during normal operation. During emergency conditions low temperatures in the service areas are no concern; therefore, the heaters provide no safety function and are not required for system operability.

3/4.7.7 CONTROLLED VENTILATION AREA SYSTEM

The OPERABILITY of the controlled ventilation area system ensures that radioactive materials leaking from the penetration area or the ECCS equipment within the pump room following a LOCA are filtered prior to reaching the environment. The operation of this system and the resultant effect on offsite dosage calculations was assumed in the safety analyses.

*Effective for 6 months beginning August 9, 1988

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ATTACHMENT B

PLANT SYSTEMS

3/4.7.4 ULTIMATE HEAT SINK

LIMITING CONDITION FOR OPERATION

3.7.4 Two independent trains of ultimate heat sink cooling towers shall be OPERABLE with each train consisting of a dry cooling tower (DCT) and a wet mechanical draft cooling tower and its associated water basin with:

- a. A minimum water level in each wet tower basin of 97% (-9.86ft MSL)
- b. An average basin water temperature of less than or equal to 95°F.
- c. Fans as required by Table 3.7-3.

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

ACTION:

- a. With one wet mechanical draft cooling tower inoperable due to low water level and/or high average water temperature, restore the wet mechanical draft cooling tower to OPERABLE status within 72 hours or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- b. With both wet mechanical draft cooling towers inoperable due to low water level and/or high average water temperature, restore at least one wet mechanical draft cooling tower to OPERABLE status within 1 hour and restore both wet mechanical draft cooling towers to OPERABLE status within 72 hours of initial loss, otherwise be in at least HOT STANDBY within the next 6 hours and COLD SHUTDOWN within the following 30 hours.
- c. With the number of OPERABLE fans less than required by Table 3.7-3 on one DCT/WCT train, restore the number of OPERABLE fans to within the requirements of Table 3.7-3 within 72 hours (except as specified in Action e.), or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.
- d. With the number of OPERABLE fans less than required by Table 3.7-3 on both DCT/WCT trains, restore the number of OPERABLE fans to within the requirements of Table 3.7-3 for 1 DCT/WCT train within 1 hour and comply with ACTION c. (except as specified in ACTION e.), or be in HOT STANDBY within the next 6 hours and in COLD SHUTDOWN within the following 30 hours.

PLANT SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

- e. With a Tornado Watch in effect, and the number of fans OPERABLE within the missile protected area of a DCT less than that required by table 3.7-3, restore the inoperable fan(s) to OPERABLE status within 1 hour, or be in at least HOT STANDBY within 6 hours and in HOT SHUTDOWN within the following 6 hours.
- f. With more than one DCT or WCT fan inoperable and the outside air temperature greater than 70°F, determine the dry bulb temperature at least once every 2 hours. If the temperature is $\geq 80^\circ\text{F}$, determine the wet bulb temperature and verify that the minimum fan requirements of Table 3.7-3 are satisfied.

SURVEILLANCE REQUIREMENTS

4.7.4. Each train of ultimate heat sink shall be determined OPERABLE:

- a. At least once per 24 hours by verifying the average water temperature and water level to be within their limits.
- b. At least once per 31 days, by verifying that each wet tower and dry tower fan that is not already running, starts and operates for at least 15 minutes.

TABLE 3.7-3

ULTIMATE HEAT SINK MINIMUM FAN REQUIREMENTS

AMBIENT CONDITION	DRY BULB $\geq 90^{\circ}\text{F}$ OR WET BULB $\geq 81^{\circ}\text{F}$	$80^{\circ}\text{F} \leq \text{DRY BULB} < 90^{\circ}\text{F}$ AND WET BULB $< 81^{\circ}\text{F}$	DRY BULB $< 80^{\circ}\text{F}$ AND WET BULB $< 76^{\circ}\text{F}$
Fan Requirements (1)	14 DCT*** and 8 WCT	12 DCT*** and 4 WCT*	9 DCT** and 4 WCT*
	OR 15 DCT and 7 WCT*		

NOTE: With more than one fan inoperable comply with ACTION f.

- (1) All fans of a dry cooling tower section are inoperable if component cooling water is secured to that section.

* With any WCT fan(s) out-of-service in any cell, covers must be in place on the out-of-service fan(s) or the entire cell (i.e. 4 fans) declared out-of-service.

** With a tornado watch in effect, at least 8 of the DCT fans under the missile protected portion of the DCT shall be OPERABLE.

***With a tornado watch in effect, all 9 DCT fans under the missile protected portion of the DCT shall be OPERABLE.

PLANT SYSTEMS

BASES

3/4.7.4 ULTIMATE HEAT SINK

The limitations on the ultimate heat sink level, temperature, and number of fans ensure that sufficient cooling capacity is available to either (1) provide normal cooldown of the facility, or (2) to mitigate the effects of accident conditions within acceptable limits.

The UHS consists of two dry cooling towers (DCTs), two wet cooling towers (WCTs), and water stored in WCT basins. Each of two 100 percent capacity loops employs a dry and wet cooling tower.

Each DCT consists of five separate cells. Cooling air for each cell is provided by 3 fans, for a total of 15 per DCT. The cooling coils on three cells of each DCT (i.e. 60%) are protected from tornado missile impact by grating located above the coils and capable of withstanding tornado missile impact. With a Tornado Watch in effect and the number of fans OPERABLE within the missile protected area of a DCT less than that required by Table 3.7-3, ACTION e requires the restoration of inoperable fans within 1 hour or plant shutdown as specified. This ACTION is based on FSAR analysis (subsection 9.2.5.3.3) that assumes the worst case single failure as, 1 emergency diesel generator coincident with a loss of offsite power. This failure occurs subsequent to a tornado strike and 60% cooling capacity of a DCT is assumed available.

Each WCT has a basin which is capable of storing sufficient water to bring the plant to safe shutdown under all accident conditions. Item a of LCO 3/4.7.4 requires a minimum water level in each WCT basin of 97% (-9.86 ft. MSL). The bases for this elevation is WCT water evaporation and drift loss calculations, which concluded that during a LOCA 173,930 gallons would be evaporated from one WCT basin. When the WCT basin water level is maintained at -9.86 ft. MSL, each basin has a minimum capacity of 174,000 gallons. Each WCT consists of two cells, each cell is serviced by 4 induced draft fans, for a total of 8 per WCT. There is a concrete partition between the cells that prevents air recirculation between the fans of each cell. Covers are required on fans declared out-of-service to prevent air recirculation between fans within a cell.

Table 3.7-3 specifies increased or decreased fan OPERABILITY requirements based on outside air temperature and humidity. Because temperature and humidity are subject to change during the day, ACTION f requires periodic temperature readings to verify compliance with Table 3.7-3 when more than 1 fan is inoperable. When outside air temperature (DRY BULB) is $\geq 80^{\circ}\text{F}$, WET BULB readings are necessary to ensure increased OPERABILITY requirements are met when WET BULB $\geq 81^{\circ}\text{F}$.

The limitations on minimum water level and maximum temperature are based on providing a 30-day cooling water supply to safety-related equipment without exceeding their design basis temperature and is consistent with the recommendations of Regulatory Guide 1.27, "Ultimate Heat Sink for Nuclear Plants," March 1974.