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W3F1-2004-0013

November 5, 2004

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington, DC 20555

SUBJECT: License Amendment Request NPF-38-255
Removal of Requirements Associated with the Ultimate Heat Sink Dry Cooling Tower Fans (TS 3.7.4)
Waterford Steam Electric Station, Unit 3
Docket No. 50-382
License No. NPF-38

Dear Sir or Madam:

Pursuant to 10 CFR 50.90, Entergy Operations, Inc. (Entergy) hereby requests an amendment for Waterford Steam Electric Station, Unit 3 (Waterford 3) to modify Technical Specification (TS) 3.7.4, "Ultimate Heat Sink" and modify TS Table 3.7-3, "Ultimate Heat Sink Minimum Fan Requirements Per Train."

Waterford 3 TS currently requires all the Dry Cooling Tower (DCT) fans with cooling coils under the missile grating to be operable during a tornado watch. If one (or more) of these DCT fans is inoperable during a tornado watch, it is required to be restored to operable status within one hour or place the plant in Hot Standby within 6 hours. The purpose of this TS change is to allow the plant to take credit for the DCT fans that are not under the missile grating to meet the fan requirements specified in TS Table 3.7-3. In addition, the proposed change will delete the requirement to monitor ambient temperature conditions when the DCT fan is inoperable on an inoperable train of the Ultimate Heat Sink.

Technical Specification Action 3.7.4.c, which requires a certain number of DCT fans under the missile grating portion of the DCT to be operable during a tornado watch, will be deleted. Technical Specification Action 3.7.4.d, which requires TS Table 3.7-3 to be verified every 2 hours when an Ultimate Heat Sink (UHS) fan is inoperable, is being revised to clarify the Action is not required if the affected UHS train is inoperable. Technical Specification Table 3.7-3 will also be revised to ensure consistency with the above changes. These changes are based on a tornado missile analysis that was performed for Waterford 3 and the elimination of an operational burden when the UHS is inoperable. In addition, TS Bases 3/4.7.4, "Ultimate Heat Sink," will be modified to address the changes identified above.

A001

Waterford 3 will retain the existing tornado missile grating currently protecting the DCT fan cooling coils.

Attachment 1 contains descriptions and technical justifications for the proposed TS change. Attachment 2 contains TS markups to facilitate identifying the proposed changes. Attachment 3 identifies associated changes to the TS Bases and is provided for information only.

The proposed change has been evaluated in accordance with 10 CFR 50.91(a)(1) using criteria in 10 CFR 50.92(c) and it has been determined that this change involves no significant hazards consideration. The bases for these determinations are included in the attached submittal.

The proposed change does not include any new commitments.

Entergy requests approval of the proposed amendment by October 30, 2005. Approval of this proposed amendment will lessen the current restrictions on plant operation when a tornado watch is in effect and does not impact safe operation of the plant. Once approved, the amendment shall be implemented within 60 days. Although this request is neither exigent nor emergency, your prompt review is requested.

If you have any questions or require additional information, please contact Gregory Scott at (504) 739-6703.

I declare under penalty of perjury that the foregoing is true and correct. Executed on November 5, 2004

Sincerely,

JEV/GCS/cbh

Attachments:
1. Analysis of Proposed Technical Specification Change
2. Proposed Technical Specification Changes (mark-up)
3. Changes to Technical Specification Bases Pages – For Information Only

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Attachment 1

W3F1-2004-0013

Analysis of Proposed Technical Specification Change

1.0 DESCRIPTION

This letter is a request to amend Operating License NPF-38 for Waterford Steam Electric Station, Unit 3 (Waterford 3).

Technical Specification (TS) Action 3.7.4.c, which requires the Dry Cooling Tower (DCT) fans under the missile protected portion of the DCT to be operable, will be deleted. Technical Specification Action 3.7.4.d, which requires Table 3.7-3 to be verified every 2 hours when an Ultimate Heat Sink (UHS) fan is inoperable, will be revised to clarify that the Action is only required if the affected UHS train is operable. Technical Specification Action 3.7.4.d will also be renumbered to "3.7.4.c." Technical Specification Table 3.7-3, "Ultimate Heat Sink Minimum Fan Requirements Per Train," will be revised to ensure consistency with the above changes. These changes are based on a tornado missile analysis (Reference 6.8) that was performed for Waterford 3 and the elimination of an unnecessary Operational burden when the UHS is inoperable. In addition, TS Bases 3/4.7.4, "Ultimate Heat Sink," will be modified to address the changes identified above.

2.0 PROPOSED CHANGE

Technical Specification 3.7.4 requires two independent trains of UHS cooling towers to be operable. Each train contains a DCT and a Wet Cooling Tower (WCT). Technical Specification Table 3.7-3 specifies the minimum number of fans required for each train of components based on ambient conditions.

The proposed changes include the deletion of TS Action 3.7.4.c. This action requires the nine DCT fans which are located under the missile protected portion of the DCT to be operable with a tornado watch in effect. The action further states that if the number of operable fans is less than that required, the fans must be restored to an operable status within 1 hour or the plant must be placed in Hot Standby within six hours and in Hot Shutdown within the following 6 hours. Consistent with this proposed change, the "*" note on TS Table 3.7-3, which states "With a tornado watch in effect, all 9 DCT fans under the missile protected portion of the DCT shall be OPERABLE," will be deleted.

In addition, TS Action 3.7.4.d will be revised as stated below and renumbered to "3.7.4.c."

> With any UHS fan inoperable, determine the outside ambient temperature at least once every 2 hours and verify that the minimum fan requirements of table 3.7-3 are satisfied (Required only if the associated UHS is OPERABLE).

Consistent with the change to TS Action 3.7.4.c, Note (1) in TS Table 3.7-3 will be revised by changing "Action d" to "Action c." The associated TS Bases will also be modified.

In summary, the proposed change will delete current TS Action 3.7.4.c and revise current TS Action 3.7.4.d to make it only applicable when the associated UHS train is operable, and renumber it to 3.7.4.c. Changes are also proposed to TS Table 3.7-3 to ensure consistency with the proposed changes to the Action statements.

3.0 BACKGROUND

The function of the UHS is to dissipate the heat removed from the reactor and its auxiliaries during normal operation, during refueling, or after a design basis accident. The UHS consist of dry and wet cooling towers, and the water stored in the wet cooling tower basins. The UHS consists of two 100% capacity trains. Each train employs one dry and one wet cooling tower.

The DCTs remove heat from the Component Cooling Water (CCW) system, which is a closed cooling system that serves reactor auxiliaries. The Auxiliary Component Cooling Water (ACCW) system is a separate system that provides cooling water to the CCW heat exchangers and pumps it to the wet cooling towers for heat dissipation to the atmosphere. The CCW and ACCW systems are described in Final Safety Analysis Report (FSAR) Section 9.2.2.

Each DCT is sized to dissipate 60% of heat removed by the CCW System after a Loss of Coolant Accident (LOCA) assuming the historically highest ambient dry bulb temperature (102°F). The heat removal capacity of the DCTs varies significantly depending on the CCW temperature, atmospheric dry bulb temperature, and heat removal by the ACCW system. Each DCT consist of five separate cells, each cell containing two 40 ft. long vertical cooling coils, arranged in a "V" shape. Cooling for each cell is provided by three fans. The cooling coils of three DCT cells of each tower are protected from tornado missiles by grating above the coils.

The DCTs are designed for safe shutdown earthquake loads and also to withstand differential pressure which may be induced by a tornado or postulated explosions at the site. The DCTs are designed to ensure low probability of damage by tornado missiles by the following features:

- The cooling towers are protected on all sides by plant outside walls up to elevation +30 ft. mean sea level.
- The cooling towers are designed with multiple cells (five cells per each DCT) and multiple fans (3 fans per cell, 15 fans total) to ensure that damage by tornado missiles will not significantly affect heat removal capability.
- In addition to the multiple cells and fans which reduce the probability of damage to the cooling towers by tornado missiles, DCT cooling coils of three cells are protected by grating designed to withstand tornado missiles.

The DCTs are further described in Final Safety Analysis Report (FSAR) Section 9.2.5.

Each WCT is sized to dissipate 40% of the heat removed to the atmosphere by the CCW system after a LOCA, assuming the coincident ambient wet bulb temperature (78°F) at the historically highest ambient dry bulb temperature (102°F). The capacity of the WCT varies significantly, depending on the CCW temperature to be maintained and atmosphere wet bulb temperature. Each WCT consists of two cells; each cell is serviced by four induced draft fans. The WCTs are further described in FSAR Section 9.2.5.

In Waterford 3 License Amendment 168, issued on September 7, 2000 (Reference 6.5), the staff agreed that Waterford 3 had demonstrated (by an analysis, Reference 6.7, based on Electric Power Research Institute Topical Report, *Tornado Missile Risk Evaluation Methodology, EPRI NP-2005*, Volumes I and II, also known as TORMIS) that the probability for a tornado missile strike is acceptably low as related, in part, to all the DCT fans, motors, associated conduits and electrical boxes (DCT components). Since the calculation did not include the cooling coils of two DCT cells per train that are not under the missile grating, the probability for a tornado missile strike calculation was updated (Reference 6.8) to include these DCT cooling coils. The results are discussed in Section 4.0.

4.0 TECHNICAL ANALYSIS

Technical Specification Action 3.7.4.c, which requires a certain number of DCT fans under the missile protected portion of the DCT to be operable, will be deleted. As discussed below, based on a probability analysis using the TORMIS methodology, the probability of a tornado strike to the DCT components not currently under the tornado missile grating is acceptably low such that tornado missile protection is not required.

Nuclear power plants must be designed to withstand the effects of tornado and high wind generated missiles so as not to impact the health and safety of the public in accordance with the requirements of General Design Criteria (GDC) 2 and 4. Standard Review Plan (SRP) Sections 3.5.1.4 (Reference 6.4) and 3.5.2 provide review guidance for tornado missile protection. Branch Technical Position AAB 3-2, which was originally referenced by the SRP, states that protection of structures, systems and components (SSCs) necessary to place and maintain the plant in a cold shutdown condition may generally be accomplished by designing protective barriers to preclude missile strikes. If protective barriers are not installed, the structure and components themselves should be designed to withstand the effects of a tornado. SRP Section 3.5.1.4 also includes guidance for users to estimate the probability per year of damage to the total of all important SSCs due to a specific design basis natural phenomenon capable of generating missiles. If the probability is greater than the acceptable probability in Regulatory Guide 1.117, "Tornado Design Classification," then specific design provisions must be provided to reduce the estimate of damage probability to an allowable level.

In the safety evaluation (SE), dated October 26, 1983 regarding the TORMIS methodology proposed in Electric Power Research Institute (EPRI) Report NP-2005 (Reference 6.1 and 6.2), the staff concluded that the methodology is well conceived and well developed and can be utilized when assessing the need for positive tornado missile protection for specific safety-related plant features. This methodology must consider five plant-specific points and appropriate information regarding its use.

The NRC Staff approved the probability risk methodology to assess the need for additional positive (physical) tornado missile protection of specific features at Waterford 3. The changes were based on an evaluation using NRC Staff approved probability risk methodology and acceptance criteria for determining the SSCs that required physical protection from tornado missiles.

In order to determine the physical protection requirements of various systems and components at Waterford 3, an analysis (Reference 6.7) was performed using TORMIS

methodology. This analysis calculated the probability of tornado missiles striking an important system or component at Waterford 3. The five plant-specific points were also addressed and submitted with the October 29, 1999 submittal and the June 29, 2000 supplement, and were approved by the NRC in Amendment 168 on September 7, 2000.

Conservatisms were included in the analysis to demonstrate that the risk is expected to be lower than the 10^{-6} per year established by the NRC, including the following:

- the targets were assumed to be damaged upon a strike
- the surface area of cylindrical targets was based on their full surface area amplified by 10%.
- the surface of electrical boxes was based on all six sides
- no shielding effect for groups of pipes or conduits
- important, non-safety related targets were included
- the missile population was conservative including assumptions that all missiles were minimally restrained

The target areas were divided into three categories. Category 1 areas included safety related, ultimate heat sink (UHS) including DCT fans, motors, associated conduits and electrical boxes, CCW piping, accumulators, and cabinets. Category 2 areas contained some safety-related targets not listed in Category 1. Category 3 areas contained non-safety related components. The total Waterford 3 plant probabilities for safety and non-safety related plant SSCs is the summation of the probabilities of the three target area categories described above.

The calculated total probability for a missile strike on SSCs described above was 6.4×10^{-7} per year, which was within the acceptance criteria of 10^{-6} per year established by the NRC staff. This number did not include the cooling coils of the two DCT cells per train not currently under the missile grating. When all of the DCT cooling coils are included in the calculation, the results are 6.8×10^{-7} per year. Therefore, the identified targets, including all of the DCT cooling coils, need no additional physical protection from a tornado missile strike and will be considered available following a tornado. This is consistent with the NRC SE, dated September 7, 2000, which stated that due to the low probability of tornado missile damage, the identified plant features that are unprotected are not required to have additional protective tornado missile barriers. Therefore, it is acceptable to not require all missile protected fans to be operable when under a tornado watch.

TS Action 3.7.4.d (required when any UHS fan is inoperable) will be renumbered to "3.7.4.c," and will be modified to state that the requirements to determine outside ambient temperature and to verify fan requirements of TS Table 3.7-3 only required when the associated UHS train is operable. Therefore, this Action will eliminate an operational burden when the DCT fans are incapable of dissipating the heat load assumed in the safety analysis. The requirements of the Action will be resumed in accordance with the Action requirements after the associated UHS train is returned to service.

Consistent with the changes to the Actions, the "*" note in Table 3.7-3 will be deleted and Note (1) will be revised to reference "Action c" instead of "Action d." This change is administrative to retain the consistency with the TS Actions.

5.0 REGULATORY ANALYSIS

5.1 Applicable Regulatory Requirements/Criteria

The proposed changes have been evaluated to determine whether applicable regulations and requirements continue to be met.

Entergy Operations, Inc. (Entergy) has determined that the proposed changes do not require any exemptions or relief from regulatory requirements, other than the Technical Specification (TS), and do not affect conformance with any General Design Criterion (GDC) differently than described in the Final Safety Analysis Report (FSAR).

The plant design and licensing basis was predicated in part on two important concepts, the concept of a low probability of offsite hazards which is presented in Standard Review Plan (SRP) 2.2.3 (Reference 6.6) and the concept of low probability of damage by virtue of these design features.

The missile spectrum and the identification of missiles generated by tornadoes was reviewed and approved at the construction phase stage before the issuance of SRP 3.5.1.4, "Missiles Generated by Natural Phenomena." This conclusion is explicitly stated in the NRC Safety Evaluation Report (SER) for Waterford 3, section 3.5.1.4. Waterford 3 was evaluated for offsite hazards, which included tornado missiles from natural phenomena, on the basis of a generally accepted probability criterion stated in SRP 2.2.3. This SRP probability criterion as incorporated in SRP 2.2.3 specifically states that, "... the expected rate of occurrence of potential exposures in excess of 10 CFR Part 100 guidelines of approximately 10^{-6} per year is acceptable if when combined with reasonable qualitative arguments, the realistic probability can be shown to be lower." SRP 3.5.1.4 also reinforced this criterion by stating: "The methodology of identification of appropriate design basis missiles generated by natural phenomena shall be consistent with the acceptance criteria [10^{-6} per year] defined for the evaluation of potential accidents from external sources in SRP 2.2.3." The NRC in SER Section 3.5.1.4 concluded that the missile spectrum and the identification of missiles generated from natural phenomena were acceptable and met the guidelines of Regulatory Guide 1.76, "Design Basis Tornado for Nuclear Power Plants."

The proposed changes do not effect Waterford 3's compliance with applicable regulations and requirements.

5.2 No Significant Hazards Consideration

The proposed change will modify TS 3.7.4, "Ultimate Heat Sink," for Waterford Steam Electric Station, Unit 3 (Waterford 3). The proposed change will delete TS Action 3.7.4.c which requires the nine missile protected Dry Cooling Tower (DCT) fans in each train to be operable whenever a tornado watch is in effect. The change also includes a revision to TS Action 3.7.4.d, which requires TS Table 3.7-3 to be verified every 2 hours when an Ultimate Heat Sink (UHS) fan is inoperable, by adding a parenthetical statement that it is only required if the associated UHS is operable. TS 3.7.4.d will also be renumbered to "3.7.4.c." To support these changes, note 1 and the "*" note on Table 3.7-3, "Ultimate Heat Sink Minimum Fan

Requirements Per Train" will also be modified to be consistent with the changes to the Actions.

Entergy has evaluated whether or not a significant hazards consideration is involved with the proposed amendment by focusing on the three standards set forth in 10 CFR 50.92, "Issuance of amendment," as discussed below:

1. Does the proposed change involve a significant increase in the probability or consequences of an accident previously evaluated?

   Response: No.

   The proposed change will delete the requirement to have all the DCT fans with cooling coils under the missile grating operable during a tornado watch. It has been determined (using tornado missile strike probability methodology – TORMIS) that the probability of damage to the DCT components not under the missile grating (fans, motors, associated conduits, electrical boxes, and cooling coils) is acceptably low. With respect to the probability of occurrence or the consequences of an accident previously analyzed in the FSAR, the possibility of a tornado reaching Waterford 3 and causing damage to plant systems, structures and components, including the DCT fans, is a design basis event considered in the FSAR. The probability of a tornado-generated missile strike on the DCT components was analyzed using the NRC Staff approved probability method TORMIS. TORMIS showed that the change from essentially relying on DCT fans with cooling coils under the missile grating to relying on all operable DCT fans during a tornado watch is acceptable and represents an acceptably low probability of occurrence of tornado generated missile strikes on the DCTs. On this basis, the proposed change is not considered to constitute a significant increase in the probability of occurrence or the consequences of an accident.

   The proposed change to TS Action 3.7.4.d eliminates an unnecessary requirement, to determine ambient conditions and verify compliance with TS Table 3.7-3, when an Ultimate Heat Sink (UHS) fan is inoperable due to its associated train of UHS being inoperable. The determination of ambient temperature conditions and validation of the required number of fans based on the temperature will continue to be required when an UHS fan is inoperable and the associated train of UHS is operable. The UHS fans will not dissipate the required heat load when the associated train of UHS is inoperable, assuming the coincident ambient wet bulb temperature (78°F) at the historically highest ambient dry bulb temperature (102°F). This change represents a burden reduction and has no impact on plant safety. This change also does not impact the initiators or mitigation of any design basis event.

   The proposed revision to TS Table 3.7-3 ensures consistency with the revisions to the TS Actions. This change is administrative and has no impact on the initiators or the mitigation of accidents previously evaluated.

   Therefore, the proposed change does not involve a significant increase in the probability or consequences of an accident previously evaluated.

2. Does the proposed change create the possibility of a new or different kind of accident from any accident previously evaluated?

   Response: No.

   The proposed change will delete the requirement to have all the DCT fans with cooling coils under the missile grating operable during a tornado watch. It has been determined that the probability of damage to the DCT components not under the missile grating is acceptably low. A tornado at Waterford 3 is a design basis event considered in the FSAR. Therefore, the change will not contribute to the possibility of or be the initiator for any new or different kind of accident, or occur coincident with any of the design basis accidents in the FSAR. The low probability threshold established for tornado missile damage to system components is consistent with these assumptions.

   The proposed change to TS Action 3.7.4.d eliminates an unnecessary requirement, to determine ambient conditions and verify compliance with TS Table 3.7-3, when an Ultimate Heat Sink (UHS) fan is inoperable due to its associated train of UHS being inoperable. The determination of ambient temperature conditions will continue to be required when an UHS fan is inoperable with the associated train of UHS operable. There are no plant modifications or design changes proposed.

   The proposed revision to TS Table 3.7-3 ensures consistency with the revisions to the TS Actions. This is an administrative change.

   The above changes also do not have any impact on plant systems nor do they have any impact on the way plant systems are operated. Therefore, the proposed changes do not create the possibility of a new or different kind of accident.

3. Does the proposed change involve a significant reduction in a margin of safety?

   Response: No.

   The proposed changes do not involve a significant reduction in a margin of safety. The existing licensing basis for Waterford 3 with respect to the design basis event of a tornado reaching the plant, generating missiles, and directing them toward the DCT components is to provide positive missile barriers. The basis for the proposed change recognizes that there is a low probability, below an established acceptance limit, that a tornado missile will strike DCT components. The change from essentially relying on DCT fans with cooling coils under the missile grating to relying on all operable DCT fans during a tornado watch is acceptable and represents an acceptably low probability of occurrence of tornado generated missile strikes on the DCTs. Therefore, this change is not considered to constitute a significant decrease in the margin of safety.

   The proposed change to TS Action 3.7.4.d eliminates an unnecessary requirement, to determine ambient conditions and verify compliance with TS Table 3.7-3, when an Ultimate Heat Sink (UHS) fan is inoperable due to its associated train of UHS being inoperable. The determination of ambient temperature conditions will continue to be

required when an UHS fan is inoperable with the associated train of UHS operable. When the UHS is not available, the fans cannot dissipate the required heat load, assuming the coincident ambient wet bulb temperature (78°F) at the historically highest ambient dry bulb temperature (102°F). Therefore, it is not necessary to monitor ambient temperature and ensure the fan requirements of TS Table 3.7-3 are met when the UHS train is inoperable. This change represents an operational burden reduction and has no impact on plant safety.

The proposed revision to TS Table 3.7-3 ensures consistency with the revisions to the TS Actions. These changes are administrative and have no impact on the operation of the plant, mitigation of analyzed events, or plant safety.

Therefore, the proposed change does not involve a significant reduction in a margin of safety.

Based on the above, Entergy concludes that the proposed amendment presents no significant hazards consideration under the standards set forth in 10 CFR 50.92(c), and, accordingly, a finding of "no significant hazards consideration" is justified.

5.3 Environmental Considerations

The proposed amendment does not involve (i) a significant hazards consideration, (ii) a significant change in the types or significant increase in the amounts of any effluent that may be released offsite, or (iii) a significant increase in individual or cumulative occupational radiation exposure. Accordingly, the proposed amendment meets the eligibility criterion for categorical exclusion set forth in 10 CFR 51.22(c)(9). Therefore, pursuant to 10 CFR 51.22(b), no environmental impact statement or environmental assessment need be prepared in connection with the proposed amendment.

6.0 REFERENCES

6.1 Electric Power Research Institute (EPRI) Report No. NP-2005, "Tornado Missile Simulation Methodology - Computer Code Manual," August 1981.

6.2 EPRI Report No. NP-2005 Vol. 2, "Tornado Missile simulation and design methodology - Volume 2: Model Verification and Database Update," August 1981.

6.3 USNRC Regulatory Guide 1.76, "Design Basis Tornado for Nuclear Power Plants," April 1974.

6.4 USNRC Standard Review Plant (SRP) 3.5.1.4, "Missile Generated by Natural Phenomena".

6.5 USNRC to Waterford 3 Safety Evaluation Report – Issuance of Amendment No. 168 Re: Amendment for a previously Unreviewed Safety Question regarding design basis concerning tornado missile (TAC NO. MA7359).

6.6 USNRC Standard Review Plant (SRP) 2.2.3, "Evaluation of Potential Accidents".

6.7 Calculation ECC99-008 revision 0, Tornado Generated Missile Strike at Waterford 3

6.8 Calculation ECC99-008 revision 1, Tornado Generated Missile Strike at Waterford 3

Attachment 2

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Proposed Technical Specification Changes (mark-up)

PLANT SYSTEMS

LIMITING CONDITION FOR OPERATION (Continued)

ACTION: (Continued)

c. With a Tornado Watch in effect, all 9 DCT fans under the missile protected portion of the DCT shall be OPERABLE. If the number of fans OPERABLE is less than required, 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.

c. With any UHS fan inoperable, determine the outside ambient temperature at least once every 2 hours and verify that the minimum fan requirements of Table 3.7-3 are satisfied.

SURVEILLANCE REQUIREMENTS

4.7.4. Each train of UHS shall be determined OPERABLE:

a. At least once per 24 hours by verifying the average water temperature and water level to be within specified 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.

add

(Required only if the associated UHS is OPERABLE)

TABLE 3.7-3

ULTIMATE HEAT SINK MINIMUM FAN REQUIREMENTS PER TRAIN

DRY COOLING TOWER

AMBIENT CONDITION	DRY BULB ≥ 98°F	< 98°F DRY BULB ≥ 91°F	< 91°F DRY BULB
Fan Requirements(1)	15	14	12

WET COOLING TOWER

AMBIENT CONDITION	WET BULB ≥ 75°F	< 75°F WET BULB ≥ 70°F	WET BULB < 70°F
Fan Requirements(1)	8	7**	4**

(1) With any of the above required UHS fan inoperable comply with ACTION d.

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

** 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) must be declared out-of-service. If four fans are out of service in the same cell, the covers do not have to be installed.

ADD *NOT USED

Attachment 3

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Changes to Technical Specification Bases Pages
For Information Only

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 missiles 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 c 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 design basis 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 164,389 gallons (218,155 gallons with the non-essential load of spent fuel cooling) would be consumed 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. The WCT basin is also credited as a source of Emergency Feedwater (EFW). However, the above LOCA water usage bounds the amount of EFW required from the WCT basin for all design basis accident conditions. 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. The table provides the cooling tower fan OPERABILITY requirements that may vary with outside ambient conditions. Fan OPERABILITY requirements are specified for each controlling parameter (i.e., dry bulb temperatures for DCT fans and wet bulb temperatures for WCT fans). The calculated temperature values (EC-M95-009) associated

PLANT SYSTEMS

BASES (Continued)

the UHS train to be declared inoperable and

with DCT and WCT fan requirements have been rounded in the conservative direction and lowered at least one full degree to account for minor inaccuracies. Failure to meet the OPERABILITY requirements of Table 3.7-3 requires entry into the applicable action. Because temperature and humidity are subject to change during the day, ACTION c requires periodic temperature readings to verify compliance with Table 3.7-3 when any cooling tower fan is inoperable.

Meet

c

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.

Add

IT IS NOT NECESSARY to determine ambient temperature conditions AND verify compliance with TS TABLE 3.7-3 when an Ultimate Heat Sink (UHS) fan is declared inoperable and its associated train of UHS has been declared inoperable.