10 CFR 50.90
L-2014-236
July 24, 2014

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251
Renewed Facility Operating License Nos. DPR-31 and DPR-41

Subject: Response to Containment and Ventilation Branch Request for Additional Information, Regarding License Amendment Request No. 231, Application to Revise Ultimate Heat Sink Temperature Limit

References:

1. Florida Power & Light Company Letter L-2014-216, "License Amendment Request No. 231, Application to Revise Technical Specifications to Revise Ultimate Heat Sink Temperature Limit," July 10, 2014.
2. Florida Power & Light Company Letter L-2014-226, "License Amendment Request No. 231, Application to Revise Ultimate Heat Sink Temperature Limit – Request for Emergency Approval," July 17, 2014.
3. Email from A. Klett (NRC) to R. Tomonto, et al. (FPL), "Turkey Point 3 and 4 Request for Additional Information – LAR 231 (TAC MF4392 and MF4393)," July 22, 2014.

In Reference 1, Florida Power & Light Company (FPL) requested an amendment to the Technical Specifications (TS) for the Turkey Point Nuclear Plant (Turkey Point), Units 3 and 4. The proposed amendment would revise the ultimate heat sink (UHS) water temperature limit from 100°F to 104°F.

In Reference 2, FPL supplemented the July 10, 2014 application requesting the U.S. Nuclear Regulatory Commission (NRC) to review and approve it on an emergency basis.

In Reference 3, the NRC Containment and Ventilation Branch (SCVB) staff requested additional information (RAI). The enclosure to this letter provides the FPL response to the RAI .

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The additional information provided in the enclosure to this letter does not impact the no significant hazards determination and environmental considerations previously provided in Reference 1.

There are no new commitments made in this submission.

If you have any questions or require additional information, please contact Mr. Robert Tomonto at 305-246-7327.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on: July 24, 2014.

Very truly yours,

Michael Kiley
Vice President
Turkey Point Nuclear Plant

Enclosure: Response to Request for Additional Information Regarding LAR No. 231, Application to Revise Ultimate Heat Sink Temperature Limit

cc: USNRC Regional Administrator, Region II
USNRC Project Manager, Turkey Point Nuclear Plant
USNRC Senior Resident Inspector, Turkey Point Nuclear Plant
Ms. Cindy Becker, Florida Department of Health

Response to Request for Additional Information from the

Containment and Ventilation Branch Regarding

Turkey Point Units 3 and 4

License Amendment Request No. 231

Application to Revise Ultimate Heat Sink Temperature Limit

Enclosure

Background

By letter dated July 10, 2014, as supplemented by letter dated July 17, 2014, Florida Power & Light Company (FPL) submitted a license amendment request (LAR) for the Turkey Point Nuclear Generating Station Unit Nos. 3 and 4 (Turkey Point). FPL requested revisions to the Turkey Point Technical Specifications (TS), Section 3/4.7.4, "Ultimate Heat Sink."

The U.S. Nuclear Regulatory Commission's (NRC) Containment and Ventilation Branch (SCVB) staff reviewed the information provided and determined that additional information is needed to complete the review. The NRC staff request for additional information (RAI) and the FPL response follows.

SCVB RAI-1

The LAR does not clearly describe changes in the current methodology for analyzing the component cooling water (CCW) supply cooling water temperature to the emergency containment coolers (ECCs) and residual heat removal (RHR) heat exchanger (HX). In the revision of the Turkey Point Updated Final Safety Analysis Report (UFSAR) dated April 17, 2013, page 14.3.4-25, under the heading, "Noding Structure," the last sentence states:

> *"The recirculation system model uses GOTHIC component models for the residual heat removal and component cooling water heat exchangers and pumps. Recirculation flow from the sump is modeled as a boundary condition."*

Page 13 of 17 of the LAR enclosure (under the heading, "Safety Analysis Scenarios,") states:

> *"The calculation for CCW heat exchanger performance was revised using the HX3/HX4 computer program to demonstrate that the CCW heat exchangers can remove the necessary post-accident containment heat load for the LOCA and MSLB containment integrity analyses."*

A. Does the HX3/HX4 computer program replace the currently used GOTHIC methodology in the current licensing basis analysis? If so, please describe in detail how the HX3/HX4 computer program replaces the GOTHIC modeling to determine the revised CCW supply temperature to the ECCs and RHR HX, while considering the limiting values of all of the post-accident CCW HX heat loads. Please include the analysis inputs and assumptions used in the revised method justifying their conservatisms.

FPL Response

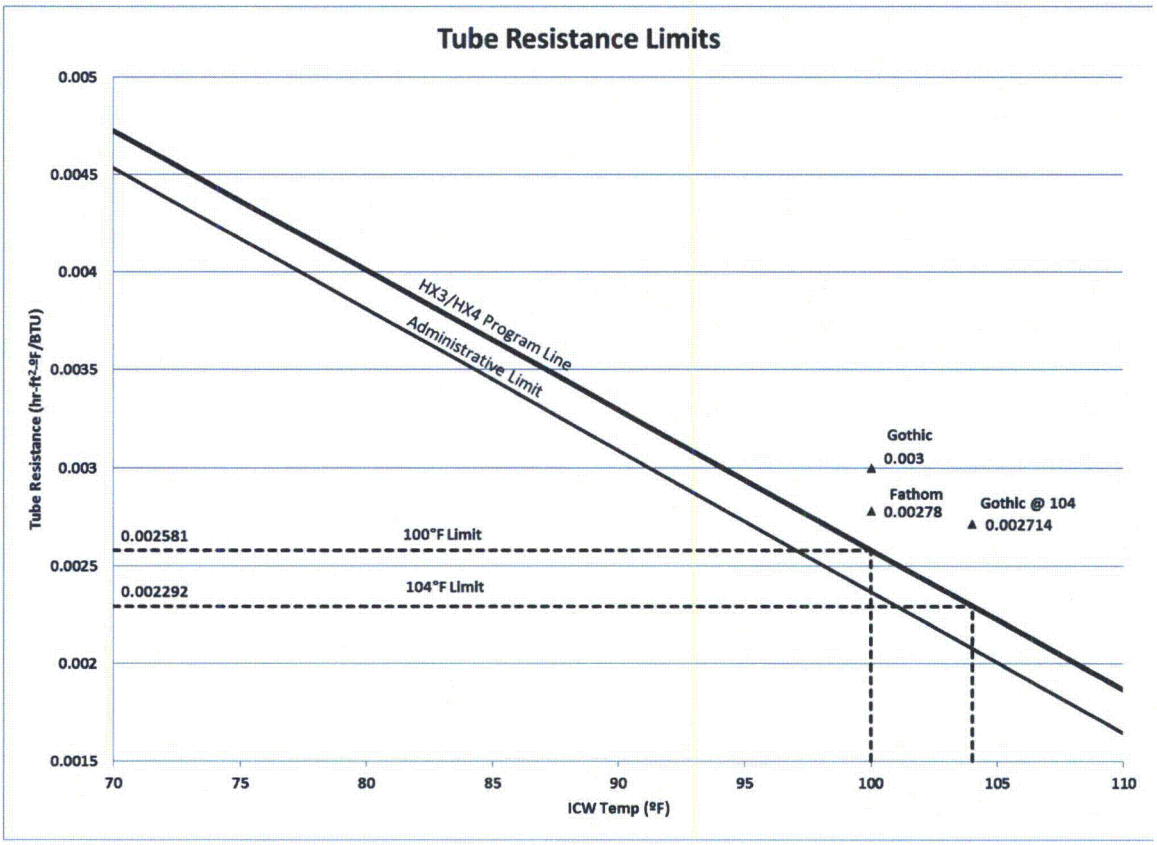
No, the HX3/HX4 program does not replace the GOTHIC methodology to analyze containment for any over pressurization accident analysis (MSLB and LOCA). The

GOTHIC containment model described in the UFSAR is one integrated model that includes the component models for CCW pumps, CCW heat exchangers and RHR system. Furthermore, no inputs, assumptions, or changes of any kind are required or have been made to the containment analysis as the result of the proposed increase to the allowable ultimate heat sink (UHS) temperature. The current UFSAR methodology remains the GOTHIC analysis currently described in the UFSAR. All results (reported containment pressure, CCW supply / return temperatures, CCW heat removal capability, and containment building sump temperatures) remain unchanged from the results currently described in the UFSAR.

UFSAR Table 14.3.4.3-1, "Containment Analysis Parameters," currently states the intake cooling water (ICW) (UHS) temperature used for containment integrity is 100°F. The CCW heat exchanger heat removal capability is defined by the combination of the ICW temperature and the tube fouling factor (or tube resistance). The input values contained in the accident analysis calculations are 100°F ICW temperature and a corresponding 0.0030 hr-ft^2-°F/BTU CCW heat exchanger fouling factor. The same heat exchanger heat removal capability assumed in the accident analysis can be assured with a higher ICW temperature by maintaining a lower tube fouling factor. The HX3/HX4 computer program is used as part of the CCW heat exchanger surveillance and testing procedures to maintain the necessary level of cleanliness (below the administrative limit) to satisfy the required heat removal capability of the CCW heat exchangers. As can be seen, this value for the tube fouling factor assumed in the accident analysis is ***higher*** *than the tube fouling factor allowed by* the "HX3/HX4 Program Line" shown in the application (FPL letter L-2014-216) Figure 3.5-1 (included below as SCVB RAI-1 Figure 1). The surveillance and maintenance of the CCW heat exhangers assures that their heat removal capability remains conservatively bounding of that assumed in the safety analysis over a range of allowable UHS temperatures and associated tube resistance.

Figure 3.5-1 in the July 10, 2014 FPL application has a typographical error for the tube resistance at 100°F on the HX3/HX4 program line. SCVB RAI-1 Figure 1 replaces Figure 3.5-1. Additionally, the figure has been updated to provide additional clarifying information to assist the NRC staff in understanding the current analyses of record and the analyses performed for the RAI response. Specifically, the original point labeled as safety analyses is clarified to reflect that it is the AFT Fathom thermal-hydraulic model. The assumptions used in the GOTHIC analysis of record and the GOTHIC sensitivity studies in the response to this RAI are also included.

SCVB RAI-1 Figure 1



B. Using the current GOTHIC model and the proposed ICW water temperature of 104°F as input, provide the CCW supply water temperature profiles to the ECCs and RHR HX for the limiting Double-Ended Pump Suction (DEPS) and Double-Ended Hot Leg (DEHL) Break Loss-of-Coolant Accidents (LOCAs) and Main Steam Line Break (MSLB) accident, and provide the CCW peak temperature values. The analysis should be performed using the same inputs as in the current analysis, i.e., assuming the worst safety related equipment heat loads, while using the proposed improved CCW HX tube resistance. If any of the remaining inputs are revised, please justify.

FPL Response

To provide additional assurance that the accident analysis is not affected, two sensitivity cases were run to demonstrate the impact of a UHS temperature increase with a corresponding reduction in heat exchanger tube resistance (0.002714 hr-ft^2-°F/BTU). The results presented below provide the results for the maximum CCW supply temperature cases for LOCA (DEPS) and MSLB comparing the results from the current

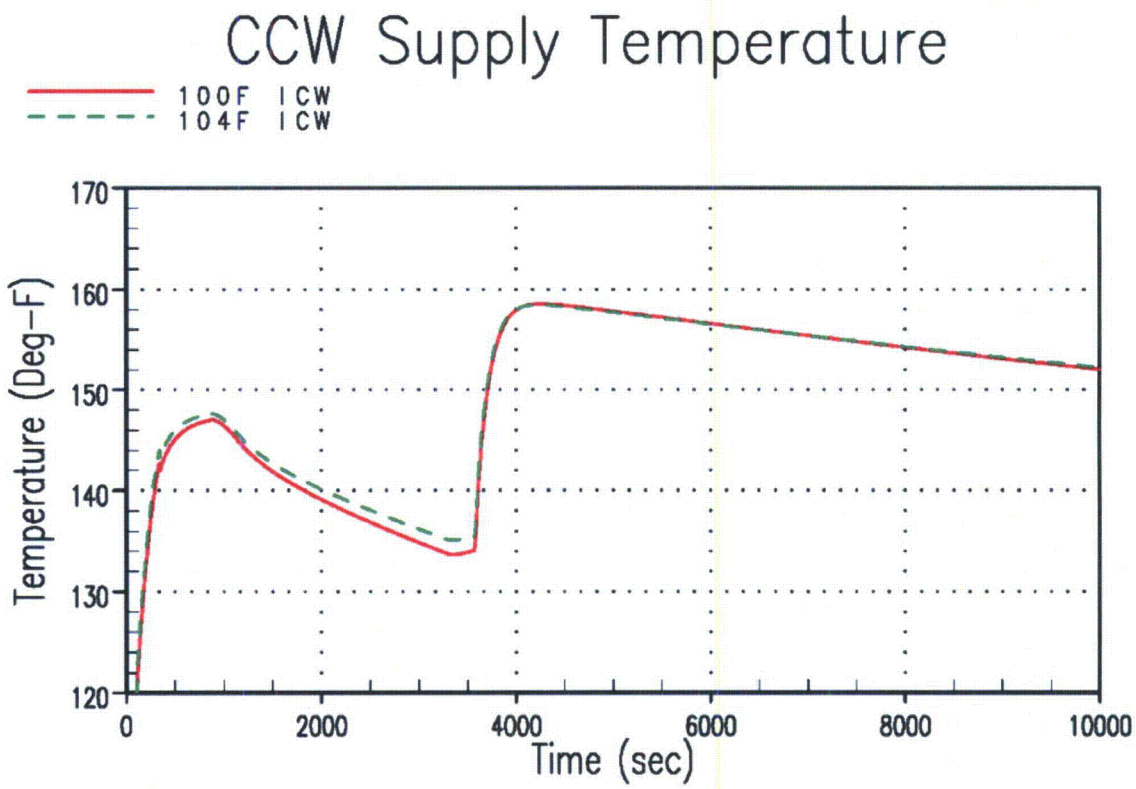
design basis (100°F UHS temperature with a 0.003 hr-ft^2-°F/BTU tube resistance) to the sensitivity case (104°F UHS temperature with a 0.002714 hr-ft^2-°F/BTU tube resistance). No other inputs were changed other than UHS temperature and tube resistance.

The CCW temperature profile for the DEHL break is not provided since this is not the limiting event for containment integrity and is analyzed only to the end of blowdown (25 seconds) and poses no challenge to CCW heat removal capability. The conclusions from the results for the DEPS break discussed below are applicable to the DEHL.

LOCA (DEPS) CCW Maximum Supply Temperature GOTHIC Case

SCVB RAI-1 Figure 2 presents the CCW supply temperature profile for LOCA. Although there are small temperature differences this temperature profile demonstrates the CCW heat removal performance remains essentially the same at 104°F ICW temperatures when the tube resistance is reduced to 0.002714 hr-ft^2-°F/BTU.

SCVB RAI-1 Figure 2



Additionally, since the licensing basis GOTHIC model is an integrated thermal hydraulic model additional containment parameters are available from this sensitivity case run. Peak containment pressure and temperature results are included with the peak CCW temperature in the table below.

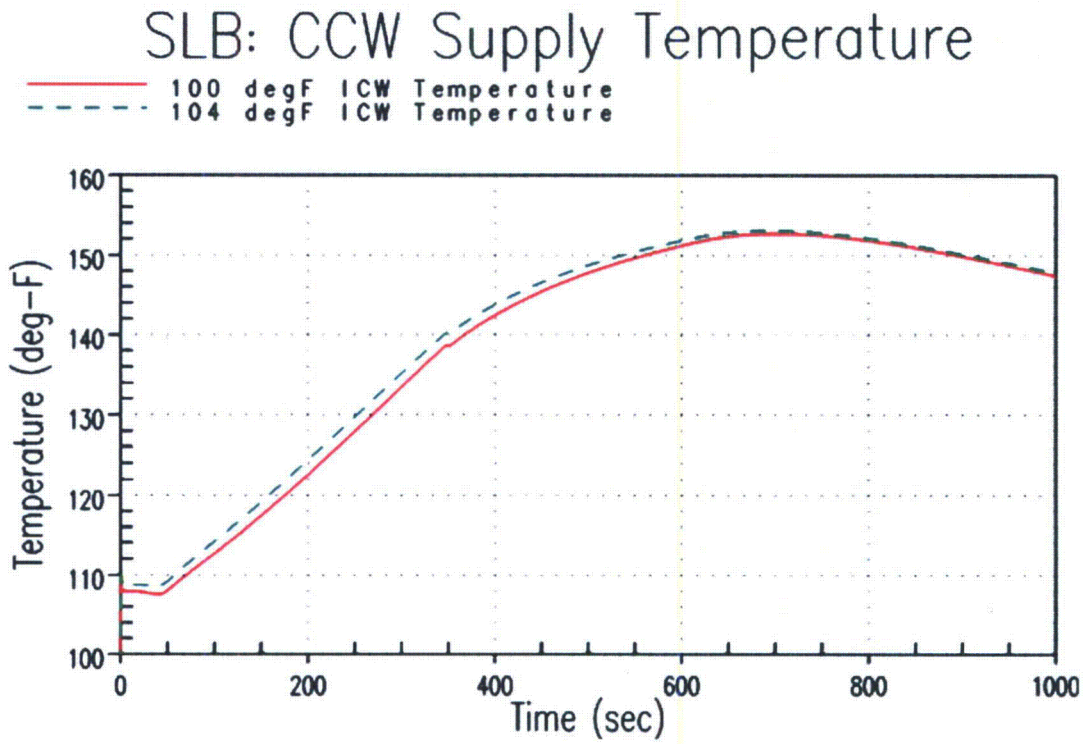
ICW Temperature (°F)	100	104
Peak Containment Pressure (psig)	50.61	50.61
Peak Containment Temperature (°F)	275.8	275.8
Peak Sump Temperature (°F)	236.6	236.6
Peak CCW supply Temperature (°F)	158.6	158.5

As shown, there is no significant change in the peak values. Note, the inputs used for this case ensure CCW supply temperatures are maximized; however, this will result in a lower containment pressure because more heat is removed from containment and transferred into the CCW system. Nevertheless, a similar insignificant impact is expected for the UFSAR limiting containment response licensing basis analysis.

MSLB Maximum CCW Supply Temperature Case

SCVB RAI-1 Figure 3 presents the CCW supply temperature profile for MSLB. Although there are small temperature differences this temperature profile demonstrates the CCW heat removal performance remains essentially the same at 104°F ICW temperatures when the tube resistance is reduced to 0.002714 hr-ft^2-°F/BTU.

SCVB RAI-1 Figure 3



For consistency we are also providing the respective peak containment pressure and temperature results corresponding to this case. They are included with the peak CCW temperature in the table below.

ICW Temperature (°F)	100	104
Peak Containment Pressure (psig)	53.14	53.16
Peak Containment Temperature (°F)	279.0	279.0
Peak CCW supply Temperature (°F)	152.7	153.1

Similarly, these results also demonstrate negligible changes between the reported results from the analysis of record.

Conclusion

Increasing the ICW temperature to 104°F while reducing the CCW heat exchanger fouling factor to 0.002714 hr-ft^2-°F/BTU provides insignificant changes to the containment peak pressure and

containment peak saturation temperatures. The results have either the same or slight changes—some up, some down—from the previously reported results. These minor temperature changes provide essentially no impact to the containment peak pressure and peak temperature response. It is concluded that small temperature variations within the CCW supply water have an insignificant impact on the containment response. The ICW temperature increase / reduced fouling factor tradeoff results in CCW heat removal performance that is essentially the same, providing an acceptable response for the GOTHIC containment model. Therefore, the current results provided in the UFSAR remain valid for the increase in ICW temperature to 104°F.

SCVB RAI-2

The Turkey Point UFSAR Revision dated April 17, 2013, Section14.3.4.3.3, "Description of Analysis," states that the containment response for a LOCA or MSLB accident is performed using GOTHIC computer code. The UFSAR Table 14.3.4.3-1, "Containment Analysis Parameters," provided the intake cooling water (ICW) temperature used for containment integrity as 100°F, which is proposed to be revised to 104°F as an input to the analysis. The Table does not explicitly state the assumed value of the CCW supply water temperature to the EECs and RHR HX in the GOTHIC analysis.

Please confirm that based on the proposed ICW temperature of 104°F, and the revised worst value of the CCW supply water temperature (to be stated in response to this RAI) to RHR HX and ECCs, all current containment analyses for containment peak pressure and temperature response and for containment heat removal are not affected and will remain as the licensing basis.

FPL Response

As stated in the response to SCVB RAI-1, these sensitivities validate that containment response would result in an insignificant change to the results presented in the UFSAR. The results of the sensitivity analysis show that the use of 104°F ICW temperature with a reduced fouling factor of 0.002714 hr-ft^2-°F/BTU has an insignificant impact on the peak calculated containment pressure, and containment temperature. Thus, CCW heat removal performance remains essentially the same at the 104°F ICW temperature when the fouling factor is reduced to 0.002714 hr-ft^2-°F/BTU. The current containment analyses for containment peak pressure, temperature and heat removal are not affected and will remain as the licensing basis.