NRR-PMDAPEm Resource

From: Klett, Audrey
Sent: Monday, July 28, 2014 3:53 PM
To: Tomonto, Bob (Bob.Tomonto@fpl.com); Czaya, Paul (Paul.Czaya@fpl.com); 'Hanek, Olga' (Olga.Hanek@fpl.com)
Cc: Cross, William (WILLIAM.CROSS@fpl.com)
Subject: Turkey Point 3 and 4 Request for Additional Information - LAR 231 (TACs MF4392 and MF4393)

By letter dated July 10, 2014, as supplemented by letters dated July 17, July 22, July 24, and July 26, 2014, Florida Power & Light Company (the licensee) submitted a license amendment request for the Turkey Point Nuclear Generating Unit Nos. 3 and 4 (Turkey Point). The licensee requested revisions to the Turkey Point Technical Specifications (TSs), Section 3/4.7.4, "Ultimate Heat Sink [UHS]."

The U.S. Nuclear Regulatory Commission (NRC) staff reviewed the information provided by the licensee and determined that it needs additional information to complete the review. The NRC staff's request for additional information (RAI) is as follows.

SCVB RAI-4

Please describe the changes that will be included in the UFSAR related to the license amendment request (e.g., regarding maintaining the component cooling water heat exchangers so that they are ready and capable of functioning as intended during normal and accident conditions).

BOP RAI-7

The licensee's response to BOP RAI-1 states that the input to HX3/HX4 is $T_{ICW\ in,}$ $T_{ICW\ out}$, $T_{CCW\ in,}$ $T_{CCW\ out}$, and intake cooling water (ICW) Flow Rate.

The licensee's response also states that "The HX3/HX4 program equates the heat gain by the ICW system, the heat loss from CCW [component cooling water] and then determines the overall heat transfer coefficient, 'U', based on the surveillance heat transfer rate and logarithmic mean temperature difference. The HX3/HX4 program determines the TR [tube resistance] based on the surveillance overall heat transfer coefficient 'U', first principle equations and appropriate film coefficients."

When doing the surveillances, Q is unknown.

Equations:

1. $Q_{ICW} = (M_{ICW})\ (C_{P\ ICW})\ (T_{ICW\ out} - T_{ICW\ in})$
2. $Q_{CCW} = (M_{CCW})\ (C_{P\ CCW})\ (T_{CCW\ in} - T_{CCW\ out})$
3. $Q = U_0\ (A)\ LMTD$
4. $Q = Q_{ICW} = Q_{CCW}$

Where:
Q_{ICW} = Heat Gain to ICW from CCW
$C_{P\ ICW}$ = ICW Specific Heat
M_{ICW} = ICW Mass Flow Rate
$T_{ICW\ out}$ = ICW Outlet Temperature
$T_{ICW\ in}$ = ICW Inlet Temperature
Q_{CCW} = Heat Loss from CCW to ICW
M_{CCW} = CCW Mass Flow Rate
$C_{P\ CCW}$ = CCW Specific Heat
$T_{CCW\ in}$ = CCW Inlet Temperature
$T_{CCW\ out}$ = CCW Outlet Temperature

U_0 = Overall Heat Transfer Coefficient
A = Total Tube Exterior Surface Area
LMTD = log mean temperature differential

Variables that are underlined are known.

Q is needed to get U_0, which is needed to get TR (tube resistance), so that one can accurately enter Figure 3.5-1 of the licensee's letter dated July 10, 2014, or the graphs of HX3/HX4. The unknowns are Q, $C_{P\ ICW}$, M_{CCW}, and U_0. Considering equations 1, 2, and 3, there are 3 equations and 4 unknowns.

A. How does the licensee know the value of U_0?
B. When the licensee knows the value of U_0, how does it find TR knowing that the tube side film coefficient is affected by the algae?
C. How does the licensee know it has the correct TR when doing surveillances and thus is able to know that there is sufficient heat transfer capability for a design basis accident?

BOP RAI-8

In its response to BOP RAI-6 by letter dated July 26, 2014, the licensee stated, "The RHR [residual heat removal] Pump mechanical seals are cooled by CCW [component cooling water] through mechanical seal coolers with process fluid on the tube side and CCW water on the shell side. Per Drawing 5610-M-450-96, Sheet 1, CCW is to be available at 145ºF [degrees Fahrenheit] initially, decreasing to 125ºF in 16 hours."

The licensee also stated, "The CS [containment spray] Pump mechanical seal is cooled by CCW through a mechanical seal cooler. The maximum operating temperature for the Containment Spray Pump mechanical seal is 205ºF. Per the vendor data sheets for the mechanical seals on the Unit 4 CS pumps, 3 gpm [gallons per minute] of flow at 150ºF is needed for the CS pump seal coolers."

However, the peak CCW supply temperature to the RHR and CS pumps during a loss-of-coolant accident, double-ended pump suction (LOCA-DEPS) break approaches 160°F and stays above 150°F for several hours after the accident, according to the licensee's letter dated July 24, 2014. The CCW supply temperature appears to be too high to meet the vendor-specified cooling requirements for these pumps. Discuss how the RHR and CS pumps will have adequate cooling to run continuously in order to perform their design basis function during a design basis accident.

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