Braidwood Ultimate Heat Sink Temperature Tech Spec Limit Change

Diurnal Curve Methodology

Agenda:

- Problem Statement
- Proposed Solution
- Scope Overview
- Schedule

Constellation.

Problem Statement

Braidwood Technical Specification 3.7.9 limits the maximum temperature of the Ultimate Heat Sink to 102 °F.

In July of 2020, environmental conditions resulted in a recorded UHS temperature that exceeded 101 °F. Although the maximum average temperature remained below the TS limit, the existing margin is < 1 °F. This summer, the maximum recorded UHS temperature was approximately 96 °F. Furthermore, a Braidwood Resiliency Assessment from March of 2022 concluded that many stations are experiencing some operational challenges due to extreme temperatures in the past five years. Actions are necessary to increase the UHS temperature margin in order to ready the plant for operation in warmer future periods.

Proposed Solution

The diurnal curve allows the Tech Spec limit to change throughout the day following the diurnal temperature cycle of the UHS. The allowed limit will be the lowest early in the day with the maximum in early evening, around 18:00. The early evening is the time of maximum UHS temperature due to the solar heating throughout the day.

Preliminary assessment for the Maximum Diurnal Temperature is shown in Figure 1 below.

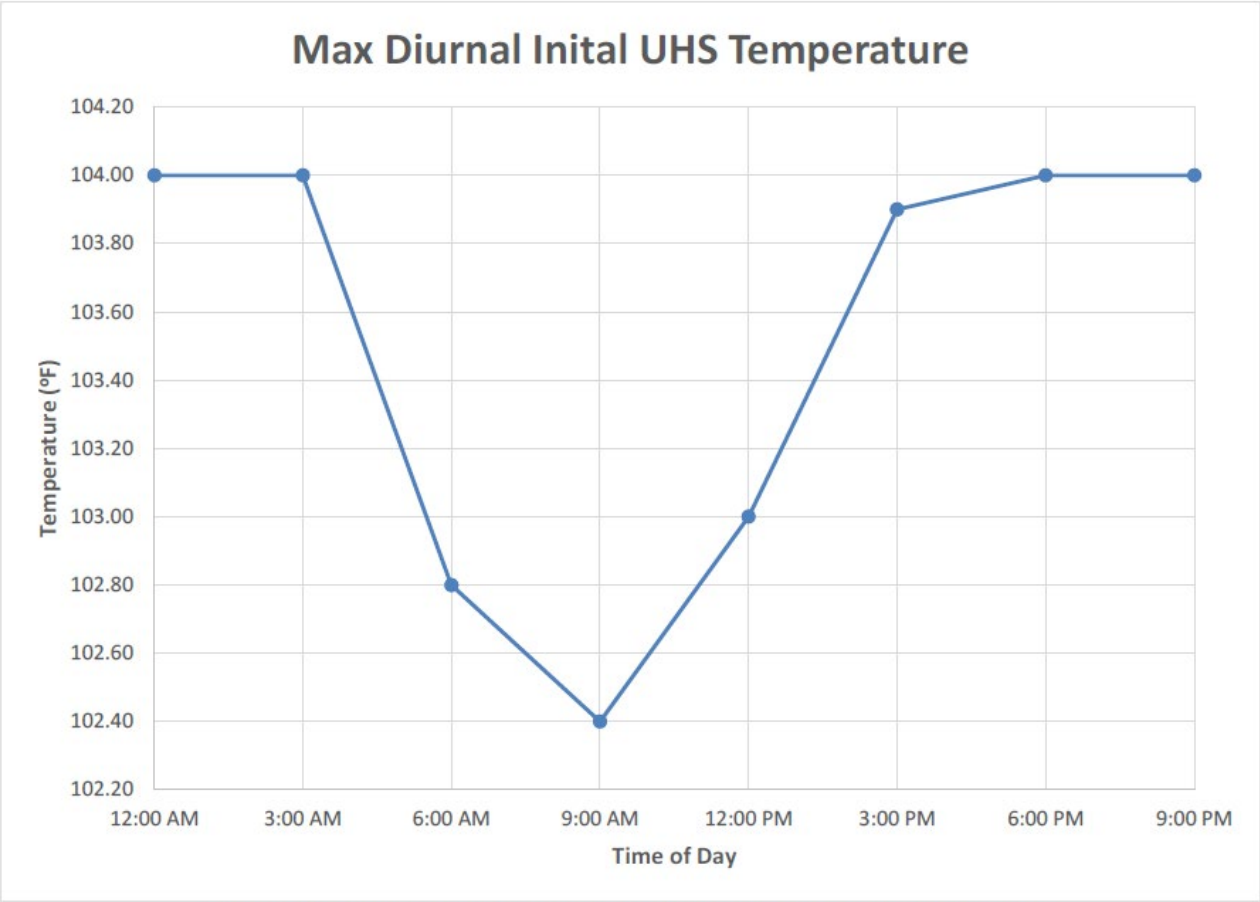

Figure 1: Max Diurnal Initial UHS Temperature – 3 SX Pumps

Scope Overview

1. UHS Post-Accident Temperature Analysis (Calc. ATD-0109)
   - -Revise UHS temperature response analysis post-accident to determine diurnal cycle curve that meets the limitations of not exceeding 104 °F in the first 36 hours
   - -No Containment Integrity Analyses update required for temperature less than or equal to 104 °F

2. Non-accident/non-LOCA analyses (104 °F max temp from Diurnal Cycle)
   - -CC HX Thermal Analysis (Calc. BRW-97-1072-M): Revise for higher SX temperature (104 °F)
   - -GL 96-06 Analysis - SX to the RCFCs: Revise for higher SX temperature (104 °F)
   - -Diesel Driven Aux. Feedwater Pump operation for 2-hours post-LOCA (Calc. BRW-13-0031-M)
     - -Revise for higher SX temperature (104 °F)

3. Determine maximum normal OPS CC temperature (dependent on CC HX Thermal Analysis)
   - -Perform EC for CC normal temperature if higher than 105 °F (expected to be around 107 °F)
   - -Disposition CC Temperature increase above 105 °F

SX = Essential Service Water System
CC = Component Cooling System

Schedule

- **Winter/Spring 2024** – Complete calculations and Engineering Change for Tech Spec limit change
  – Submit License Amendment Request to NRC

- **Early Summer 2025** – NRC approval of License Amendment Request

Therefore, the increased Tech Spec limit for the Ultimate Heat Sink will be utilized during the expected warmer temperature months in 2025.