



UNCOVERING HIDDEN CONSTRAINT IN COMPLEX COOLING WATER SYSTEM

EARLY VISIBILITY INTO SYSTEM PERFORMANCE PREVENTED A COSTLY STARTUP ISSUE

DATA-DRIVEN HYDRAULIC MODELING IDENTIFIED HIDDEN BOTTLENECK, REDUCED OPERATIONAL RISK AND IMPROVED SYSTEM PERFORMANCE

As part of a unit expansion, a Gulf Coast refinery planned to add new heat exchangers to an existing cooling water circuit to serve new process equipment. The site intended to utilize a cooling water circuit from a neighboring unit, but the team lacked confidence in how the added exchangers would affect existing users on the system.

CHALLENGE

The refinery's cooling water circuit was especially complex, with multiple two-pass sub-circuits, four header jumpers that provided a degree of flow control, and a looped header system.

With new exchangers being added, the project team needed to understand whether the planned changes would negatively affect the performance of the existing circuit and its current users.

SOLUTION

Hydrus Works developed a detailed hydraulic model of the cooling water system using a data-driven approach. A comprehensive onsite survey captured flow, pressure, and temperature data, allowing the model to be calibrated within 4% of measured conditions.

The calibrated model was used to simulate multiple operating scenarios, giving the project team clear visibility into flow distribution and the impact of the proposed exchanger additions on existing system users.

RESULTS

The model provided immediate insight into system performance and identified a critical hydraulic bottleneck in the proposed design. Left unaddressed, the issue would have restricted flow to the new exchangers on startup.

Hydrus Works also uncovered a no-cost optimization opportunity by adjusting jumper valve configurations, improving flow distribution and overall exchanger performance.

The result was increased confidence in the expansion, reduced operational risk, and a more reliable cooling water system moving forward.

A calibrated hydraulic model provided clear visibility into system performance, identified a critical bottleneck before startup, and revealed no-cost optimization opportunities.