



COOLING WATER MODELING CASE STUDY

OPTIMIZING SYSTEM PERFORMANCE AND REDUCING RISK THROUGH ADVANCED MODELING

HOW COOLING WATER SYSTEM MODELING PROVIDED VISIBILITY INTO FLOW DISTRIBUTION AND OPERATING LIMITS

A Gulf Coast refinery operating a complex cooling water network engaged Hydrus Works to develop a detailed hydraulic model of its cooling water system to gain a clear understanding of system performance under varying operating conditions and ensure the cooling water system could continue supporting plant operations safely and efficiently.

CHALLENGE

The facility's cooling water network had grown over time as new units and equipment were added. However, the system had limited visibility into how water was actually distributed across the network. Without a validated system model, it was difficult to confidently evaluate operating scenarios, troubleshoot performance issues, or plan system upgrades.

SOLUTION

Hydrus Works developed a comprehensive hydraulic model of the cooling water network using advanced system modeling techniques.

The model incorporated detailed system data including pump curves, pipe sizes, control valves and system restrictions, heat exchanger flow requirements, elevation changes, and more.

Once constructed, the model was calibrated against operating data. Hydrus Works then used the model to simulate multiple operating scenarios, allowing the facility to visualize flow distribution throughout the network and identify potential performance limitations.

RESULTS

The cooling water model provided immediate operational insight and a reliable tool for ongoing system evaluation.

- Improved understanding of flow distribution across the cooling network
- Identified hydraulic bottlenecks impacting equipment cooling
- Validated pump operating strategies and system capacity

The result was a more reliable cooling water system, reduced operational risk, and a powerful engineering tool to support future plant planning.

A comprehensive cooling water system model revealed flow distribution, system constraints, and operational limits, giving a Gulf Coast refinery the insight needed to optimize performance and plan future modifications with confidence.