

## No margin for downtime

### Redundant cooling water treatment for a hyperscale data center



#### Xylem pre-engineered multimedia filtration supports continuous operation, environmental compliance, and accelerated deployment for a Virginia campus

A major hyperscale operator launched a new data center campus in Virginia with a clear mandate: design cooling infrastructure to prevent downtime. With high availability requirements and strict discharge constraints, the project team needed a water treatment partner that could deliver quickly, adapt to design changes midstream, and build redundancy into every critical component. The design prioritized uptime protection, environmental compliance, and speed to deployment—critical requirements for hyperscale data center operations.

#### Challenge

Unlike many sites that rely on a single water source and simple treatment train, this campus required treatment of two distinct water sources. The first stream pulls intake water from a reservoir, which is filtered via multimedia filters before supplying cooling tower makeup—where suspended solids and iron can drive scaling, corrosion, and reduce heat-transfer efficiency. The second stream for non-contact cooling water blowdown from the cooling towers is filtered via multimedia filters (following upstream pH adjustment and

#### Customer

Retailer operating its own hyperscale data center

#### Challenge

Conditioning reservoir intake water for cooling makeup and treating cooling blowdown to meet discharge limits—on an accelerated schedule with mid-project design changes

#### Keys to success

Pre-engineered, feature-rich filtration with automated air scour, schedule agility, and redundant system design to minimize downtime risk

#### Solution

Vantage® Pre-Treatment—Industrial (PTI) series multimedia filters, stainless steel face piping, and automated controls

coagulation/flocculation) to meet discharge limits before returning water to the environment.

In addition, the campus was built on an accelerated schedule. After the order was placed, the project scope changed to incorporate a design modification involving exchange tanks—requiring a revised plan and timeline without compromising the delivery date or overall system integrity.

## Solution

Working alongside the site's engineering firm, Xylem specified and supplied two Vantage® Pre-Treatment—Industrial (PTI) series multimedia filtration systems to condition two separate water streams—one supplying the cooling system and another treating cooling system blowdown prior to discharge to a nearby creek. Each system was engineered around 120-inch-diameter vessels with stainless steel face piping and fully automated air scour, providing reliable particulate removal suited to the demands of cooling water applications.

The Vantage® PTI series was selected for its robust pre-engineered, preassembled, and factory-tested design, which minimizes installation and startup time while delivering automated backwash capabilities that reduce both cycle time and overall water use—addressing two of the most common operational priorities for facility managers overseeing industrial water treatment systems.

To align with the operator's uptime expectations, the overall design emphasized redundancy: the system configuration includes backup critical assets (i.e., pumps

and filtration capacity) so the campus can maintain cooling operations even if a component is offline for maintenance—protecting revenue and operational continuity. Parallel filtration capacity and redundant pumping allowed the cooling system to remain online during maintenance or equipment downtime.

As requirements shifted post-order, Xylem worked closely with the customer and the engineering firm to accommodate design changes, re-baseline the schedule, and keep equipment delivery aligned to the updated construction milestones.

## Results

At steady state, the PTI multimedia filtration train is designed to deliver the treated-water performance required for cooling-tower makeup: up to 1,200 gpm, reducing feedwater particulate and iron loading to targets of TSS <20 ppm and dissolved iron <1 ppm.

By improving water quality at the tower, the system supports longer cycles of concentration—helping improve water-use efficiency while reducing the risk of scale, corrosion, and fouling that can degrade heat-transfer performance and drive maintenance cost.

For the non-contact cooling water (NCCW) blowdown discharge, the treatment stream is designed for 200 gpm and metals control to help meet creek discharge limits—targeting soluble copper <0.03 ppm and soluble zinc ≈ 0.00 ppm, supporting regulatory compliance and cost avoidance.