Customer Success Story

Location: Texas

Applied Membranes significantly improves existing Ultrafiltration (UF) system with upgrades, repairs, and optimization

Systems that are inadequately built and installed can be very costly for operations.

Challenge

A major energy company operates a diverse portfolio of power plants, including nuclear, natural gas, wind, solar, and hydroelectric facilities.

It encountered significant issues with the performance of an ultrafiltration (UF) system supplied by another provider at one of its facilities. This was costing the company hundreds of thousands of dollars in maintenance and wastage.

The system was designed to produce **0.5 million gallons per day (MGD) UF filtrate (720 MW)** for demineralization water for power augmentation. Source water from a lake was pumped through pipelines to the project site.

The system contained two UF trains with ten (10) modules per UF train, followed by an EDI system for ultra-pure water production. However, there were major deficiencies with the existing system including:

- Unnecessary crossflow waste based upon the pretreatment and overall configuration
- Water hammering causing hydraulic shock to the membranes
- Low feed pressure to the UF system
- Inadequate pretreatment
- Other major issues causing operational challenges over the years

Applied Membranes was engaged to help salvage the system and optimize its performance.

Solution

Applied Membranes visited the facility to perform onsite engineering services. Engineering services were performed in less than 2 weeks. After evaluation, AMI implemented several solutions including:

1) Replaced the HYDRAcap I/O PES membranes with INGE multi-bore UF membranes
2) Replaced backwash pumps
3) Added pretreatment, coagulant system, and control values
4) Increased UF backwash flow and reduced hydraulic transient events in the process piping system
5) Modified PLC programming to optimize performance
6) Identified and fixed fatal flaws in the original UF system program, after detailed control systems monitoring of the dynamic UF cycles. The issue involved a valve that was opening and bypassing backwash water around the UF membranes during the UF backwash cleaning cycle
7) Optimized CEB chemical cleaning cycles
8) Upgraded equipment and trained personnel

Results

Applied Membranes completed startup and commissioning and improved the membrane water treatment system. AMI also trained local operators on maintenance and air integrity testing of the membranes.

AMI system optimization was designed to keep the operation as simple as possible for a reliable water treatment system. The system was monitored daily for the first few weeks to ensure the system was functioning optimally.

With the new AMI/INGE UF system in operation, the site operators no longer had to pin broken fibers and RO cleanings were reduced to less than 2x per year.

After operating under the new sequences and conditions, the overall water treatment system functioned more efficiently. Results include treating less raw water, wasting less water in the treatment process, and extending the life of all membranes throughout the water treatment plant (lower SDI values and fewer fiber repairs).

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