A More Compact, Reliable and Robust UF solution for Xiaojihan Coal Mine

Wastewater Reuse Project — Capacity: 9.2 MGD

Challenge

Increase wastewater treatment capacity to comply with environmental regulations and Zero Liquid Discharge (ZLD) requirements

- Increase capacity to process “difficult-to-treat” wastewater to comply with stringent regulatory requirements
- Overcome performance and reliability challenges of the installed PUF system that compromised treatment capacity and required significant maintenance to prevent reverse osmosis (RO) failures

Solution

44%
Increase in capacity

2-6x
Longer lifetime

Upgrade treatment process with a Nanostone CM-151 ultrafiltration membrane system:

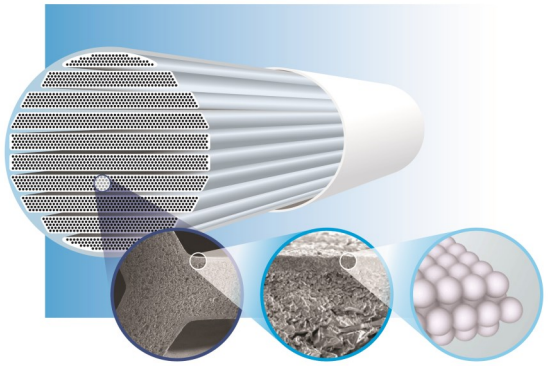
- Implement a trouble-free option, alleviating pressure on operations
- Restore treatment capacity to meet ZLD requirements and new environmental regulations
- Improve efficiency, reduce maintenance, and ensure reliable performance, resulting in a lifetime 2-6 times longer than the PUF system
- Increase overall treatment capacity by 44% without additional pre-treatment

Xiaojihan Coal Mining Wastewater Reuse Project Background

To meet the new Zero-Liquid Discharge (ZLD) regulations governing wastewater treatment, the Xiaojihan Coal Mine, a member of the China Huadian Group, had to expand the capacity of its wastewater management system.

The mine faced a number of issues with its existing wastewater treatment process, a submerged polymeric ultrafiltration (PUF) membrane system. As is often the case with PUF systems as they age, fouling had become a frequent issue, and the need to perform Clean-In-Place (CIP) had increased to multiple times a week. That, combined with frequent fiber breakage in the PUF membrane and subsequent failure of their downstream RO membrane, resulted in a treatment capacity that was below the plant requirements.

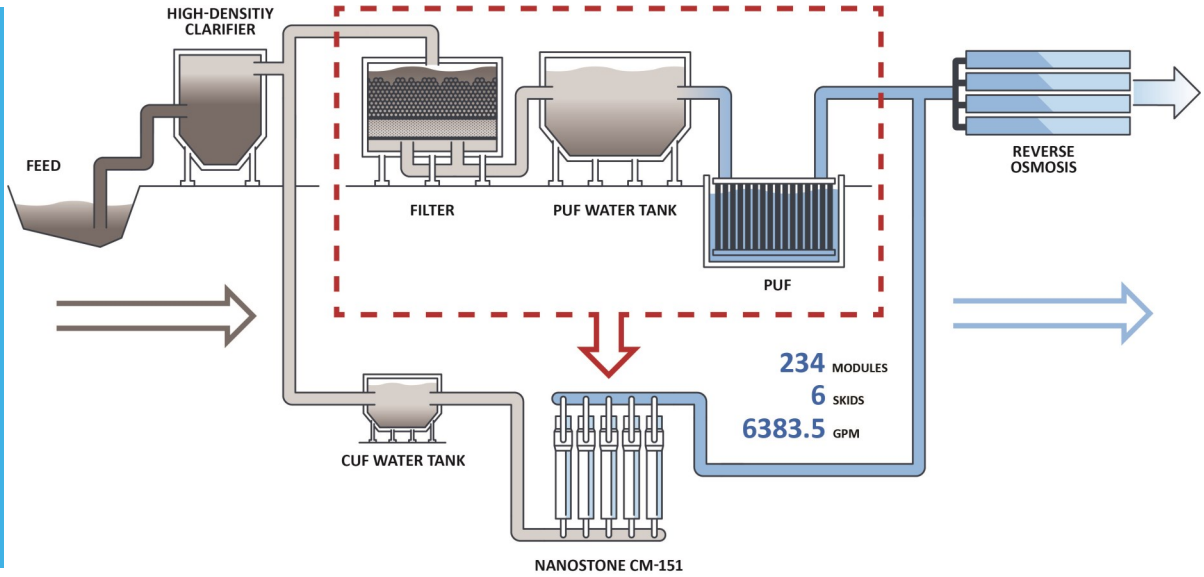
Nanostone's CM-151 ceramic ultrafiltration membrane system provided a clear choice to tackle Xiaojihan's difficult-to-treat wastewater. The outstanding anti-fouling characteristic of the CM-151 ceramic membrane required fewer chemical cleanings. In addition, the unique, patented monolith design of the CM-151 tolerates higher incoming water variability, which optimized the overall process operation by eliminating the pre-filter step (see below). The absence of fibers in the ceramic matrix meant that fiber breakage would no longer be an issue. The CM-151 ceramic system provided more reliable and effective performance which, in turn, stabilized the downstream RO system and allowed Xiaojihan to meet and exceed its increased capacity demand.



Feed channels are designed to maximize membrane surface area, while not compromising on flowrate. The unique surface coating and overall microstructure provide consistent, reliable removal of solids down to 30 nm in size.

The 9.2 MGD ceramic UF system helped the Xiaojihan Coal Mine meet all environmental regulations and optimize the entire treatment process. By investing in Nanostone's CM-151 ceramic UF system, the mine operators have a robust, reliable long-term solution for consistent efficiency and quality.

Nanostone's CM-151 technology was a clear choice to deliver incremental capacity without additional cost and complexity of pre-treatment.



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