Gainesville Renewable Energy, USA

Location: Florida, USA
No. of Trains: 2 x 139 gpm (2 x 32 m^3/hr)
Quantity Per Stream: 6
Total Q-SEP Membranes: 12
Application: Boiler Feed Water Treatment

Project Background

The Gainesville Renewable Energy Center is a nominal 100 MW wood-fired biomass power generation facility located in Gainesville, Florida, USA. The plant provides about 30% of Gainesville Regional Utilities' power, reducing the area's dependence on energy from fossil fuels and greenhouse gas emissions.

The client required an effective water treatment system for boiler feed water as part of their power generation process. They evaluated their options and decided a fully operating water treatment system consisting of ultrafiltration, reverse osmosis, and electrodeionization would be most suitable to provide the reliable, demineralized solution for the plant's process water. The plant's wastewater would be also applied towards a zero-liquid discharge solution to reduce the plant's environmental footprint.

QUA Solution

The client contacted QUA to install their Q-SEP® UF membranes as pretreatment for the plant's water treatment system. QUA also provided a FEDI-2 HF Fractional Electrodeionization system for the demineralization step. QUA was actively involved in the installation and commissioning process and provided the client with the strong support needed to ensure that the treatment system was running smoothly without any issues.

The Q-SEP system was designed to treat a total of 278 gpm (64 m^3/hr) through the installation of two trains of 6 modules each. The system has been running well since installation without major concerns and the client is satisfied with the process. Q-SEP's product water SDI has been less than 1 and providing high quality water for the process consistently.

This water treatment system is essential to the power plant's ability power production process. QUA's Q-SEP was a successful long-term solution to ensure that the plant would be able to successfully perform and provide renewable energy to its distribution network to the fullest extent.

About QUA

QUA is an innovator of advanced membrane technologies that manufactures and provides filtration products to address the most demanding water challenges.

Q-SEP® Hollow Fiber Membranes

Q-SEP® hollow fiber ultrafiltration modules contain membranes manufactured with QUA's innovative patented "Cloud Point Precipitation" method. This process ensures a high pore density along the length of the fiber and uniform narrow pore size distribution in the membrane. Q-SEP modules deliver superior performance characteristics and product water quality that surpass the quality from conventional UF modules. The narrow pore size distribution allows the membrane to produce water with a low silt density index (SDI). The lower product SDI leads to less frequent and easier cleaning of downstream RO membranes. In addition , the Q-SEP membranes provides an excellent rejection of bacteria and viruses.

Q-SEP UF membranes are made of modified hydrophilic polyether sulfone (PES) material that offers high fiber strength and excellent low fouling characteristics, resulting in higher membrane productivity. These hollow fiber membranes operate under a low transmembrane pressure in an inside-out flow configuration for superior performance. Applications of Q-SEP UF include pretreatment to RO systems (brackish and seawater applications), purification of surface and well water for potable applications, filtration of industrial water, and wastewater recycle and reuse.

FEDI® Electrodeionization

Fractional Electrodeionization (FEDI) is an advanced EDI technology that was developed to address the limitations of conventional EDI. FEDI is a patented two-stage process that operates in a dual voltage configuration to reduce hardness scaling that may occur in conventional EDI.

FEDI's unique design maintains an acidic condition in the first stage and basic condition in the second stage of the electrodionization concentrate chamber. This patented design reduces mineral scaling in the first stage and enhances silica removal in the second stage.