



Ethydco Refinery - Alexandria, Egypt

Project Background

The Egyptian Ethylene and Derivatives Company (ETHYDCO) is a joint venture company established with the purpose to produce Ethylene, Butadiene and their derivatives (Polyethylene, Poly Butadiene).

As part of ETHYDCO's petrochemical complex in Alexandria, a 460,000 T/Y ethylene plant and a 20,000 T/Y butadiene extraction plant were built.

For its water needs, ETHYDCO took the initiative to contract a zero liquid discharge plant that is the first of its kind in Egypt. The feed water to the plant is a mix of treated effluent and Nile River water. Due to the high variability of the inlet feed water, technologies designed to operate over a wide range of feed conditions were evaluated.

QUA's FEDI was chosen due to its capability to handle variable feed conditions with its two-stage design.

FEDI Model: FEDI-2 30X

No. of Streams: 2 x 465 gpm (2 x 105 m³/hr)

No. of Stacks: 60

Silica as SiO₂: < 20 ppb

Conductivity: 0.1 mS/cm

QUA Solution

QUA successfully supplied its Fractional Deionization (FEDI®) stacks for the RO permeate treatment. This treated water is demineralized for cooling tower blowdown uses at the plant.

The complete treatment system comprises of a membrane pretreatment system, a High Efficiency Reverse Osmosis (HERO™) system, followed by FEDI. A brine concentrator, crystallizer, and sludge treatment system are also employed to ensure ZLD capability.

The FEDI system successfully treats single pass RO water to be used for cooling tower blowdown. The water treated by FEDI exceeded the plant's requirements, particularly in the removal of silica that was possible due to FEDI's enhanced design.

About QUA

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

FEDI® Electrodeionization

Fractional Electrodeionization (FEDI) is an advancement of 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 electrodeionization concentrate chamber. This patented design reduces mineral scaling in the first stage and enhances silica removal in the second stage.