

Water Treatment System for Hydroponic Greenhouse Applications - Case Study

CURRENT SITUATION ANALYSIS

The project aimed to produce a continuous and reliable supply of low conductivity treated water from river water for greenhouse irrigation.

Variable turbidity, suspended solids, and dissolved salt loads needed to be managed through a multi stage process capable of maintaining a net product water capacity of 300 m³/hour, with automatic backwashing and chemical cleaning functions.



PROJECT INFORMATION



Water Treatment System for
Hydroponic Greenhouse
Applications



30.000 m³/day



Azerbaijan



Greenhouse Irrigation Water

TECHNICAL SOLUTION APPROACH

Vatek Environmental Technologies designed the chemical pre-treatment stage, six multimedia sand filters, two parallel ultrafiltration trains, and three reverse osmosis systems as a single integrated process.

While the sand filters reduce turbidity and suspended solids, a total of 104 UF membranes remove colloids and microorganisms, stabilising the RO feed water. Two main RO trains and a reject water RO train support product water quality and water recovery.

The PLC automation system controls the pumps, valves, chemical dosing, backwashing, and CIP sequences. Online measurements of pH, turbidity, differential pressure, flow rate, and conductivity enable continuous monitoring of process performance.

6 Sand Filters · 2 UF Trains · 3 RO Systems · PLC Automation



Automatic
Backwashing
and CIP



Multi Stage
Treatment



Adaptability to
Variable Water
Conditions



Water Suitable for
Greenhouse
Irrigation



Enhanced
Membrane
Protection



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ACHIEVED RESULTS



Designed for a product water capacity of 300 m³/hour, the solution combines chemical pre-treatment, sand filtration, ultrafiltration, and reverse osmosis stages.

Six sand filters reduce the particulate and turbidity loads in the river water, while two parallel UF systems with a total of 104 membranes provide stable feed water quality before reverse osmosis.

Two main RO trains, each with a capacity of 150 m³/hour, and a 50 m³/hour reject-water RO train reduce dissolved salts while providing additional water recovery from the concentrate stream. Automatic backwashing, flushing, and CIP functions support operational continuity.



KEY RESULTS



30.000 m³/day
Net Product Water Capacity



6
Multimedia Sand Filters



104
Total UF Membranes



3
Reverse Osmosis Systems



%75
Main RO Design Recovery Rate

