AUTOMATION

REVERSE OSMOSIS AND DESALINATION

SIMULATION-BASED SOLUTIONS

SOLUTIONS FOR DESALINATION

With a focus on simulation-driven engineering, ANDRITZ uses patented IDEAS process simulator Digital Twin technology to dynamically model seawater reverse osmosis (SWRO). An interactive simulation software, IDEAS models the operations of a real plant, including the copper concentrate process and reverse osmosis and water impulsion systems, in order to accurately predict the correct phenomenology process behavior. IDEAS can be used to generate a high-fidelity model of your entire plant—a Digital Twin—as well as models of individual processes and even virtual instruments. This state-of-the-art simulation technology minimizes start-up risks, reduces implementation costs, and predicts potential impacts on the existing operations of your SWRO plant. Dynamic simulation is a powerful tool for validating design configurations, verifying process control logic, and training and evaluating operators.

ANDRITZ

ENGINEERED SUCCESS

Applications and benefits of dynamic simulation for SWRO

DESIGN VALIDATION

ANDRITZ uses IDEAS simulation software to model plant P&IDs and generate a complete high-fidelity model of a real SWRO plant and all of its processes. Steady-state models are used to perform H&MB study of the entire process and predictive models are generated to realize process behavior before designs are implemented.

Simulation technology is also used to conduct feasibility and optimization studies, validate equipment design, and check the start-up and shutdown philosophy. Using IDEAS dynamic simulator at your SWRO plant, you can:

- Check if all the fillings lines are designed for empty start-up conditions
- Determine the best way to start the first reverse osmosis train
- Optimize the number of intake pumps required for the given number of reverse osmosis trains

LEAK DETECTION

Based on the IDEAS Digital Twin technology, ANDRITZ's Leak Detection and Locating System (LDS) is based on Extended - Real Time Transient Modeling (E-RTTM) and considers both the decision aspect of the leak alarm as well as process/operation aspects of the pipeline network. The result is nearly zero false leak alarms.

LOGIC VERIFICATION

Models use the same control logic software and operator interface as the actual SWRO plant, making it possible to improve control logic deisgn, detect and correct control logic errors before implementation, test control loops in the DCS, tune PID controllers, check the limit of pressure and flow transmitters, and test alternate control philosophies.

OPERATOR TRAINING

Simulation-based operator training enables operators to train on the new equipment and control systems in a simulated control room prior to start-up. This enables you to evaluate their performance in different scenarios and effectively minimizes the impact to your existing operations. Using simulation-based training, operators can be trained for:

- Start-up and shutdown sequences
- Emergency responses
- Process and control understanding
- Process interaction
- Scenarios such as feed pump failure and RO plant power failure

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