# 3KEYMASTER™ Process Pipe Plants
## Solutions for Process Plants and Pipelines

Power & Process Products and Services



WSC, a legacy brand of Curtiss-Wright's Simulation Group, headquartered in Frederick, MD, is a global simulation and services company. Acquired by Curtiss-Wright in 2024, WSC is recognized for the quality and efficiency of their products and flexible team-oriented approach to serving its customers.

## Process Plants

In today's competitive environment, process plants are striving to achieve higher standards of performance. Improved operator performance is a key factor in achieving these standards and training plays a critical role in making performance improvement possible. Simulators are a proven, effective tool in the training of operators and engineers. Our plant process simulation modeling utilizes the 3KEYMASTER™ real-time simulation environment developed by Curtiss-Wright's Simulation Group. This tool has been extended beyond the power applications to process applications simulating various chemical processes.

Our Simulation Group's fluid systems modeling tools, chemical kinetics, DCS and PLC solutions, and component modeling library can be used to model process plants. Plant-specific custom models can also be ported into the 3KEYMASTER™ platform and interfaced with our traditional models. These type models can retain their proprietary nature but can be embedded seamlessly in the 3KEYMASTER™ environment.
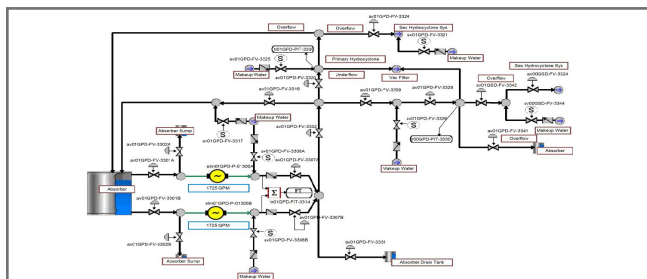


FGD Absorber Bleed Pumps Model

## IGCC Plants

Curtiss-Wright's Simulation Group completed the simulation of one of the largest Integrated Gasification Combined Cycle (IGCC) plants in the world. The IGCC plant replicates the Coal Feed System, Gasifiers, Process Air Compressors, Extraction Air Compressors, Gas Cleanup Equipment, CT, HRSG, and ST. All balance of plant systems are modeled, including condensate, feedwater, circulating water, cooling water, sour water, turbine and generator auxiliaries, tempered water, coal drying and milling loops, syngas coolers, gasifier island steam drums, recuperative heat exchangers and syngas cleaning reactors, columns, and equipment.

## Examples of Process Simulations

- Flue gas desulfurization (FGD)
- Desalination plants
- Pipeline with SCADA
- Gasifier Reactors
- Distillation Columns
- Sulfuric Acid process units
- Quench and Scrubber Columns
- Acid Gas Removal process units
- Particulate Control Devices (PCD)
- Absorbers such as $H_2S$, $CO_2$, Mercury units
- Nitrogen Plant process: Compression and Liquid storage
- Continuous fine ash depressurization system (CFAD) simulation
- Scrubbers (Water gas shift, COS hydrolysis, Ammonia scrubber)
- Compressors units simulation (e.g., Air, N2, O2, etc.)
- Ammonia Stripper and Purifier Column

# 3KEYMASTER™ Process Pipe Plants

*Solutions for Process Plants and Pipelines*

## Pipelines
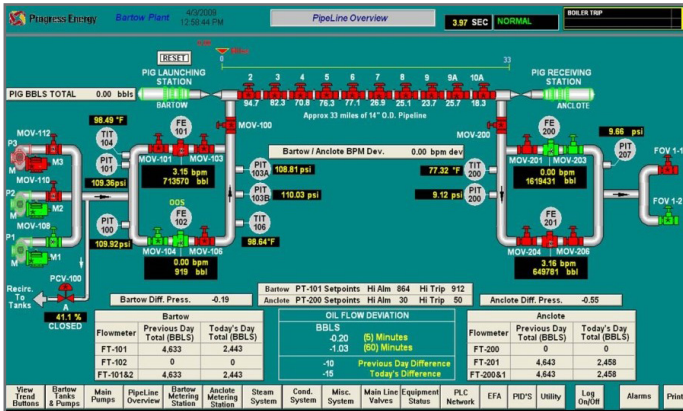


The pipeline simulator objective is to provide an engineering-grade simulator of a pipeline including the SCADA and PLCs control systems for pipeline personnel training, engineering, and control system analysis. The pipeline simulator completely and accurately models the system processes through startup/shutdown of components, valve alignments, flow changes, leaks, clogs, and both normal and faulted operations of the system. The fidelity of simulation results in an operator not being able to perceive any significant differences from the reference system.

## Desalination Plants
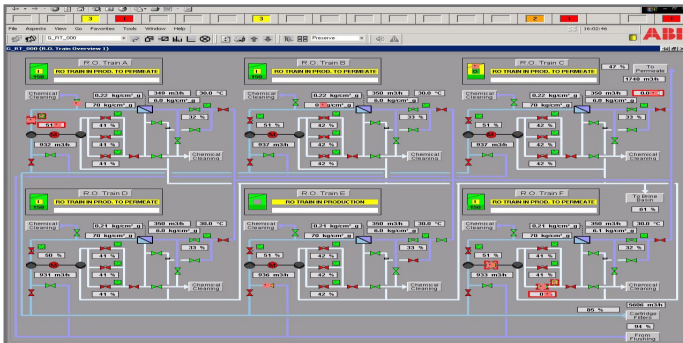


The desalination plant simulators built by our Simulation Group for desalination processes such as RO, MSF and MED provide an invaluable solution for personnel training and engineering analysis. Our fluid systems modeling tools effectively model the complete process of removal of minerals from saline water and with our vast experience with many types of DCS and PLC, we provide a high-fidelity solution, so the simulator accurately mimics the actual plant process evolutions.

## Why Choose 3KEYMASTER™?

3KEYMASTER™ is the first simulation environment developed ground-up for the Microsoft Windows® operating system. Its open architecture, fully object-oriented approach, support for flexible human interface design, and leveraging of the Windows environment, offers distinct advantages in speed and usability. To support Process plant simulation, Curtiss-Wright's Simulation Group developed chemical components physical properties and chemical kinetics applicable to the Process plant simulated. This Tool is designed to simulate chemical reactions as well as transport and incorporates modeling objects to simulate most of the components involved in the process plant. With our other modeling tools and DCS solutions, a complete process plant simulation can be created.

## Key Components

- Graphical Engineering Station (GES) with extensive run-time simulation controls and data visualization
- Powerful executive to run your models
- Versatile integration platform for Real-time I/O, third-party systems and code
- Complete suite of engineering-grade modeling tools and components library

## 3KEYMASTER™ Advantages

- Fast, efficient, and cost-effective object-oriented technology with graphics-based model construction, test, and deployment - see the 3KEYMASTER™ Product Sheet
- Modeling suite provides comprehensive, high-fidelity coverage of systems. Knowledge of physical principles and equation solution methods are embedded in the tools - see the Modeling Tools Product Sheet
- DCS and logic systems emulation, DCS stimulation, and "virtual" control systems integration - see the DCS Solutions Brochure
- Re-hosting or porting of legacy or custom code (FORTRAN, C, C++); preserves your existing investments
- Easy integration with third-party software, hardware, I/O systems, and panels
- Extendable - easy to add new modeling objects and code to provide complete simulation of complex systems, including unit operations for process industry