Dynamic simulation with Mimic Simulation Software provides a high-performance solution for operator training and control system optimization. This Digital Twin technology delivers the complete environment for control system optimization and is an effective tool for teaching process and control engineers the control and operation of ammonia production.

**Ammonia Modeling**

Solutions for ammonia facilities include dynamic models of the following process areas:
- Natural gas primary reformer, coupled with the waste heat boiler
- Natural gas secondary reformer
- Acid gas removal system
- Ammonia converter
- High and low temperature shift reactors
- Methanator
- Auxiliary separators, heat exchangers, fluid movers, and piping

**Application Capabilities**

**Natural Gas Primary and Secondary Reformers**
- Dynamic real-time mass & energy balances
- Catalyzed reforming and oxidation reactions with online adjustable kinetics
- Catalyst mass heat capacity effects
- Direct-fired heating
- Waste heat boiler flue gas heat recovery
- Real-time display of reformer reactions using Mimic Reactor View

**Acid Gas Removal System**
- Dynamic real-time mass and energy balances
- Vapor-liquid equilibrium with configurable activity coefficients
- Multiphase outlet flows

**Ammonia Converter**
- Dynamic real-time mass and energy balances
- Catalyzed ammonia reaction with online adjustable kinetics
- Reactor jacket
- Start-up heater
- Real-time display of converter reactions using Mimic Reactor View
Instructor Station

Instructor controls in Mimic and instructor screens in Mimic Component Studio allow your training team to prepare for working with the control system and process. Any element in Mimic can be manipulated or controlled, and instructor screens provide easy access in one location. Typical controls allow instructors to manipulate operating conditions, such as boundary conditions and compositions, introduce ad-hoc device failures, control scripted training scenarios, and restore snapshots to steady-state operations.

Ammonia Plant Feed Conditions
Manipulate gas quality and composition, plant water conditions, and many other boundary condition controls.

Ad-Hoc Process
Switches for individual pump and valve failures.

Boundary Conditions

Snapshots

Scenarios

Process Snapshots
Control and restore full steady-state, cold, or other Ammonia plant conditions.

Scripted Scenarios
Pre-engineered scenarios with dynamic representation of student scores.

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