



## Anticipate Challenges & Improve Operational Process

Process simulation acts like a digital “test drive” for industrial operations. Process simulation provides a clear picture of what’s working, what isn’t, and where are variables that needs to be adjusted to improve efficiency that will save both time and money. By identifying potential process upsets, testing proposed modifications, assessing overpressure scenarios for safety, and predict how energy will be consumed, you will uncover inefficiencies and avoid costly mistakes.

At Equity Engineering, our Process Technology team uses process simulation to model changes to process or operations, troubleshoot issues in a process, model pressure relieving systems, or create heat and material balances. We leverage our industry knowledge and process simulation expertise to create practical optimization studies, delivering safer, more reliable systems while supporting real-time operational decision-making.

## Equity’s Process Simulation & Optimization Services:

We help optimize your pressure relief and disposal systems, pipe gathering and distribution networks, compression and pumping systems, and distillation columns and reaction loops, among others, against unexpected scenarios. We develop steady and transient flow assurance, overpressure, optimization, thermal radiation, gas dispersion studies, and more with the required accuracy and fidelity.

- **Heat and Material Balances** for the design and analysis of chemical processes
- **Flow Assurance Studies** for piping gathering and distribution networks to identify obstacles and keep operations running smoothly
- **De-bottlenecking and Optimization** studies to identify and mitigate process constraints that limit the capacity or efficiency of a process unit or complete refinery
- **Depressuring & Overpressure Scenario Analysis** to ensure the safety of your system during depressurization or a power or other utility failure
- **Combustion, Tank, and Flash Emission Studies** to identify inefficiencies in energy use and production processes
- **Root Cause Analysis** to provide the sensitivity analysis for specific operating conditions and an accurate “what if” analysis

## Outcome of an Effective Process Simulation

Our Process Technology team applies a systematic approach that involves various steps and considerations to ensure that processes are running as efficiently and effectively as possible.

### Establish Baselines

Understand current design and operating performance metrics and identify areas for improvement before starting a process simulation.

### Audit Energy Usage

Identify the high energy consumers and efficient energy utilization to form a basis for tracking conservation efforts.

### Consider Lifecycle Cost

Account for total lifecycle process cost (CAPEX/OPEX, production efficiency, availability, and maintenance).

### Adjust Design & Operations

Ensure process equipment operates at optimal efficiency, avoid overdesign, increase heat integration, and provide adequate insulation.

### Conduct Regular Maintenance

Optimize performance through regular instrument calibration, repair or replacement of malfunctioning instruments, and routine maintenance activities.

### Apply Advanced Technologies

Use real-time gateways or digital twins to significantly enhance process optimization and provide data for continuous improvement.

### Implement Real-Time Monitoring

Employ best practices for an Operational Management System (OMS) with standardization of critical variables across different units.

## Case Study

### Process Simulation of Feedstock Changes & Resulting PRS Revalidation

**Industry:** Specialty Products

**Type of Asset:** Petrolatum and White Oil Production

**Location:** USA

**Issue:** A pharmaceutical processing facility was looking to potentially change the feedstock and needed to review the adequacy of the H&MB and PRS.

**Solution:** In the first phase, we developed a HYSYS model to obtain the new H&MB. Using this key piece of information, we successfully completed the second-phase PRS revalidation study using the HYSYS Safety Analysis module and Aspen Flare System Analyzer.

**Result:** We identified potential limitations, which helped the client plan desired feedstock changes that complied with regulatory standards.

## BENEFITS



### Better Operations

Set clear process variables, improve designs, and use energy more efficiently.



### Valuable Insights

Leverage digital tools and live data to keep processes running smoothly.



### Cost Savings

Analyze costs to invest less on operations and equipment.



### Increased Safety

Identify risks early and address issues to keep systems safe and stable.