

# Improve Steam System Performance

For Ammonia, LNG, Refining and Petrochemical facilities



The economic implications of poor steam system management could lead to serious problems for your facility. Lost revenue could be \$400 to \$800 thousand for every plant trip associated with a steam system upset. And if your steam system is not running at 100% due to bottlenecks, the amount of revenue lost could total up to \$10 million per year.

## Steam systems are critical to operations

Whether your process plant is currently operating or being built or you are considering a revamp, your steam system is one of the most important systems in your plant. And as the footprint of these plants grows, the steam system becomes even more critical to daily operation.



Since a typical steam system has multiple pressure headers to allow steam distribution to process steam generators, boilers, turbines and process units; its operation is critical to avoid plant upsets and shutdowns.

For example, a problem with the steam system in an ammonia plant could result in upsets including the loss of primary and secondary reformers, OSBL boilers and turbogeneration capacity of the plant.

## Increase operations efficiency and reliability

Many plant operators rely on dynamic simulation studies to study the dynamic response of the overall system to various plant upsets.



When used in the design phase, a dynamic steam study can minimize over-design of package boilers, properly size the let-down stations and decrease the potential for steam venting and energy losses.

Dynamic studies at existing plants strive to stabilize steam system performance and provide guidelines for efficient and reliable plant operation.

Plants utilizing dynamic simulation on their steam systems can realize the following benefits:

### Higher reliability

- Pre-tuning of key controllers
- Better handling of plant upsets
- Minimize unit-to-unit interactions

### Increase efficiency

- Validate procedures to allow faster startups
- Minimize steam venting
- Establish operations guidelines to minimize pressure excursions during upsets
- Recover more heat to generate power for the plant

### Improve safety

- Reduce potential for process trips

**KBR**

TECHNOLOGY

KNOW-HOW DELIVERED

KBR Technology specializes in developing and licensing energy-efficient and cost-effective process technologies that enhance the technical and economic positions of global oil and gas and petrochemical companies.

With thousands of successful projects worldwide, KBR combines its technology expertise with full engineering, procurement, consulting and construction services to help clients maximize the value of their assets.

KBR offers a breadth of technology licenses and process equipment for:

- Ammonia and Fertilizer
- Synthesis Gas / Syngas
- Olefins
- Coal Gasification
- Refining
- Carbon Capture and Storage/ CO2 Sequestration
- Hydrogen
- Organic Chemicals

## Our approach

KBR utilizes the latest simulation software to develop the dynamic models used in our studies. This allows us to include the most recent vendor and design data for the equipment.

A typical dynamic simulation model includes:

- All physical equipment and volumes of headers and piping
- Steam generation and let-down valve capacities
- Proprietary boiler models
- Regulatory and master controls

## Our experience

KBR has provided Advanced Chemical Engineering services to our clients since early 1980 and has an established track record of bringing tangible economic and efficiency benefits to customers. In the last ten years, we have conducted over 100 studies.

Overall dynamic simulation experience includes studies of:

- Steam systems
- Fuel systems
- Relief systems
- Depressuring
- Runaway reactions
- Compressor anti-surge systems

CLIENT	LOCATION	SCOPE
<b>Chevron Escravos</b>	Nigeria	Dynamic simulation of entire GTL plant incl. steam system, feed gas system, ATR, GTL reactor and fuel gas
<b>Qatargas</b>	Qatar	Dynamic study of LNG plant steam, refrigeration and fuel systems
<b>BFPL</b>	Australia	Dynamic simulation study of ammonia plant steam system
<b>Sonatrach</b>	Algeria	Dynamic analysis of LNG steam system to evaluate performance of new boilers and control system modifications
<b>National Fertilizers</b>	India	Dynamic analysis of steam header pressure during transient operations
<b>Pequivan</b>	South America	Dynamic steam study for the entire ammonia/urea fertilizer complex
<b>FMCL</b>	Trinidad	Steam utility system for grassroots ammonia plant

*KBR's most recent dynamic simulation experience.*

### HOW can we make your world work better?

KBR's Advanced Chemical Engineering (ACE) team provides services in the areas of advanced simulation, advanced automation systems and advanced operations management systems. For more information on how ACE can deliver results for your business, visit [kbr.com/technology](http://kbr.com/technology).

#### KBR TECHNOLOGY

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