



# SYMMETRY

## Process Software Platform

[virtualmaterials.com](http://virtualmaterials.com)



Tailored workspaces—optimized facility

Symmetry by VMG is a comprehensive simulator that empowers all aspects of your models from reservoir to product distribution.

Symmetry is built using VMG's industry proven simulation technologies that have been optimized to scale to your engineering needs. VMG's legacy of constant improvement, development, and the incorporation of new technologies will continue with Symmetry.

Symmetry uniquely integrates the modeling of fields, pipe networks, process plants and flare systems, providing an unprecedented level of collaboration and cooperation allowing teams to seamlessly transfer knowledge and expertise, maximizing the total value of the asset.

Symmetry contains a proven thermodynamic fluid representation that can be used throughout the simulator and an integrated dynamic mode tailored for each workspace that can be used when required.

# TAILORED WORKSPACES—OPTIMIZED FACILITY

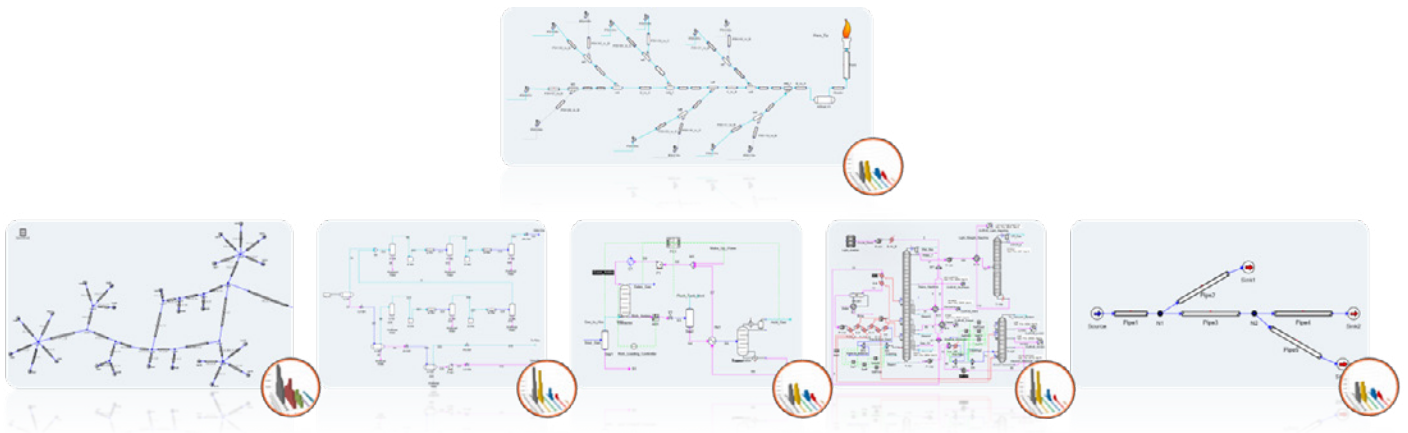
**VMGSIM:** World-class process simulation for facilities and plants

**PIPE:** Rigorous multiphase pipe network for complex and looped networks

**FLARE:** All-inclusive relief system analysis with integrated PSV, network header and stack design

**FIELD:** Fully integrated gas reservoir and multi-phase gathering system with forecasting functionality

PRODUCTION	NETWORK	PROCESS	HSE
<ul style="list-style-type: none"><li>• Inflow production relationship</li><li>• Field forecasting</li><li>• Compositional reservoir</li></ul>	<ul style="list-style-type: none"><li>• Gathering systems</li><li>• Pipelines</li><li>• Mechanistic models</li><li>• Flow assurance</li><li>• GIS input</li><li>• Pigging and slugging</li></ul>	<ul style="list-style-type: none"><li>• Gas processing</li><li>• Oil/Heavy Oil Processing</li><li>• Oil refining</li><li>• Petrochemicals</li><li>• LNG</li><li>• Utilities</li><li>• GTL, Power Generation</li></ul>	<ul style="list-style-type: none"><li>• Flare Systems</li><li>• Sizing (PSV, Separator, etc.)</li><li>• Emissions</li><li>• Depressuring/ Blowdown Studies</li></ul>



**FLUIDS:** Thermodynamics and characterization

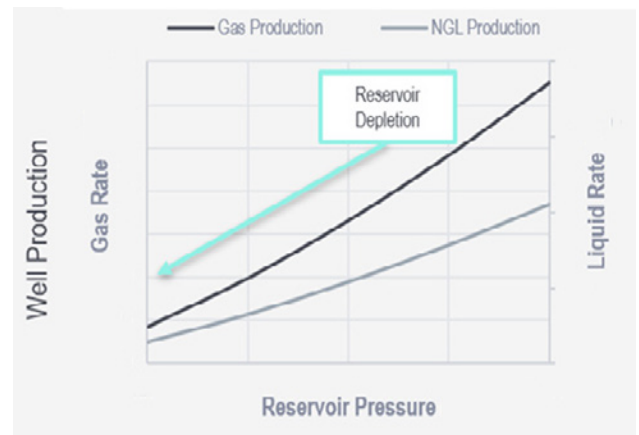
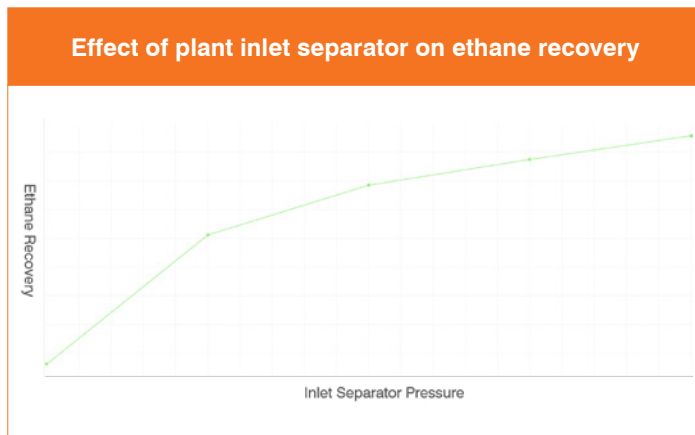
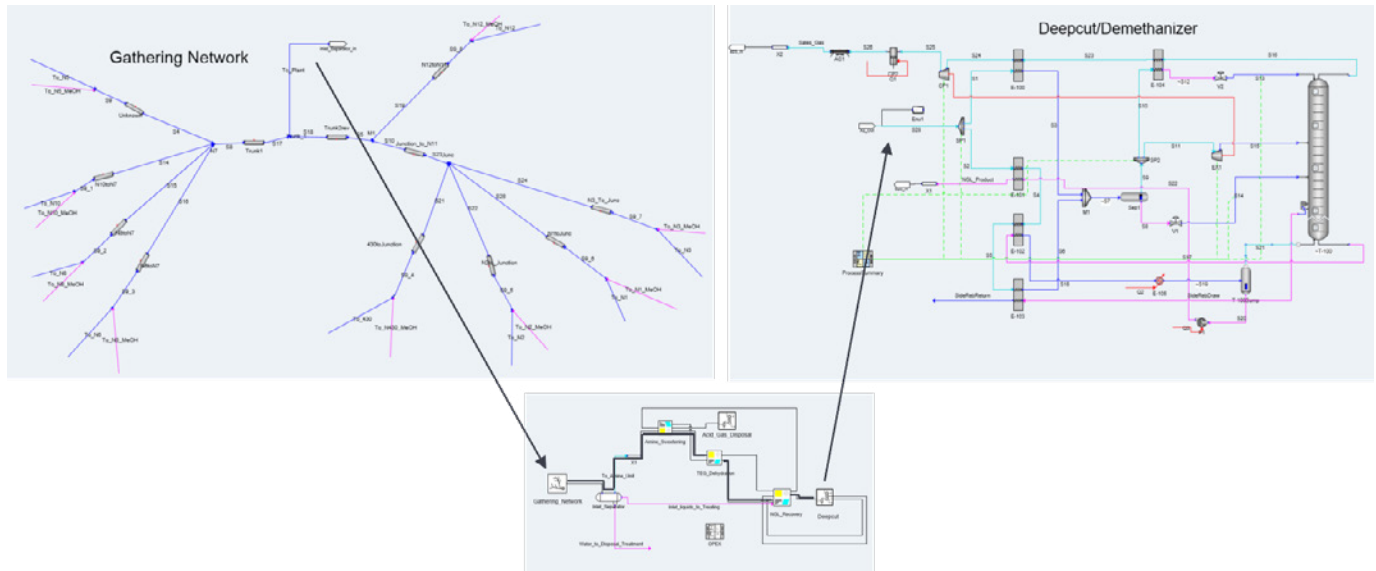
**ENGINES:** Steady state, dynamics, pressure flow solver

**PRODUCTIVITY:** Parametric studies, Optimizer

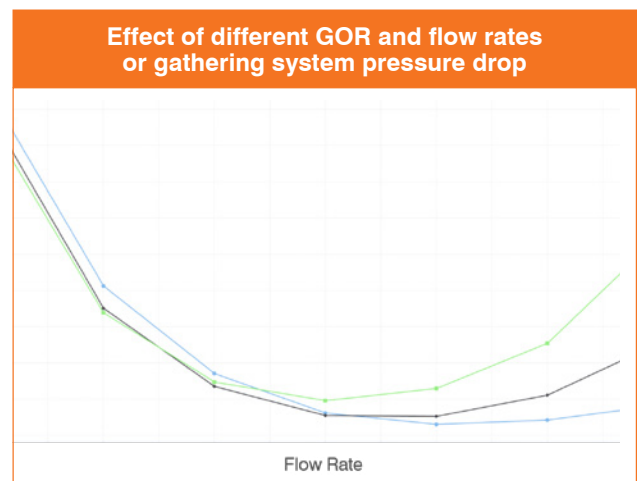
**CONNECTIVITY:** OPC, Historians, Web

# ASSET WIDE ANALYSIS

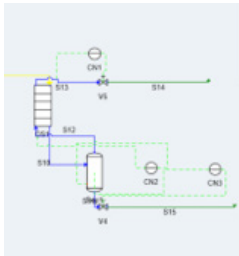
- Seamlessly assess impact of upstream changes on process operations
- Develop models to required fidelity
- Reveal interactions that may be overlooked



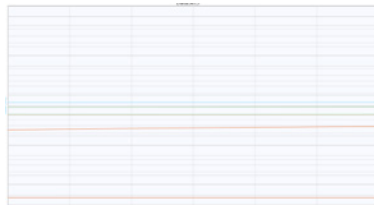
- Model conditions at any point of the asset (field and facility)
- Long term evaluation as production characteristics change
  - Early production facilities
  - Requirements of additional equipment
- Relevant economic analysis



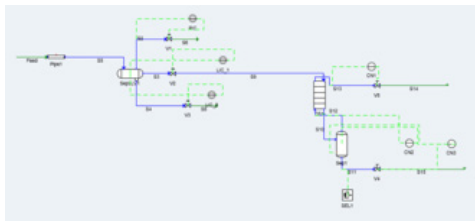
# MULTI ENGINE ANALYSIS



Control system developed with isolated feed



- Create and initialize dynamic models from existing steady state models
- Evaluate systems using both steady state and dynamics in the same case
- Use the best engine for the task at hand
- Dynamics provides additional hydraulics and transient effects
- Investigate disturbances in the process starting from the gathering system or egress lines
- Develop or troubleshoot control systems based on more realistic system disturbances

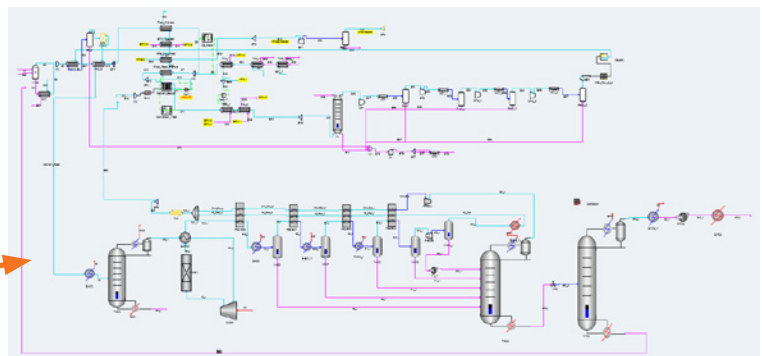
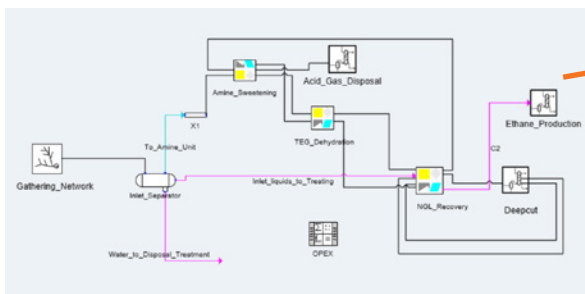


Control system implemented with feed from liquid loaded gathering line



# COMPONENT TRACKING

- Track components throughout the entire asset
- Components that impact HSE and operations eg. BTEX, H<sub>2</sub>S, CO<sub>2</sub>, Methanol, Mercaptans, etc.
  - Provide awareness and quantify risk
- Develop mitigation strategies and define impact
  - Field or facility based or a combination
- Leading fluid characterization allows blending, separation and even reactive systems to be modeled
- Accurately track properties
  - Meet desired product specifications
  - Utilize more of the available data to maximize field development
  - Evaluate wide range of alternate processes



Add downstream processes to model to evaluate viability asset wide (e.g. ethylene production from produced ethane)