



Schlumberger



Symmetry

Tailored workspaces—optimized facility

Process Software Platform Pipe Workspace



Tailored workspaces—optimized facility

Rigorous dynamic and steady-state multiphase modeling for complex pipe networks

Symmetry*, a process software platform, is a comprehensive simulator that empowers all aspects of your models from reservoir to product distribution.

The Symmetry platform 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.

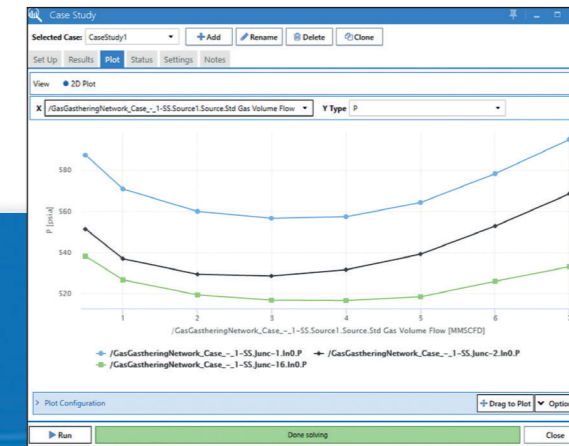
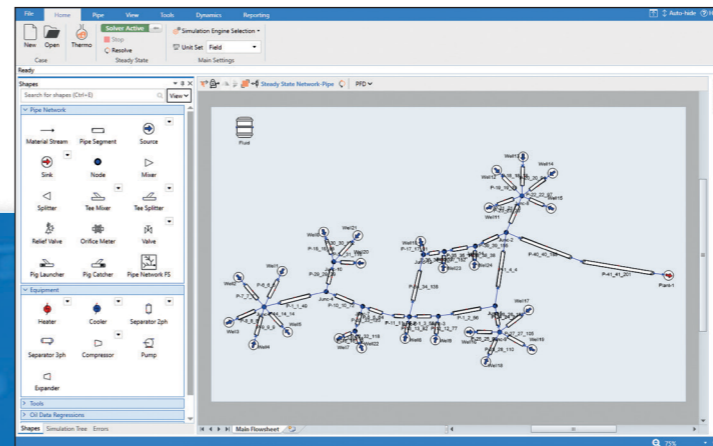
The Pipe workspace in the Symmetry platform offers a unique solution for modeling multiphase complex pipe networks. Model scope can vary from a stand-alone pipe network to a seamlessly integrated asset model that includes the hydrocarbon- gathering network as well as the processing facilities.

Highlights

The streamlined workflow in the Pipe workspace enables engineers to build models for any stage of the asset life cycle, from field development to asset production operations optimization.

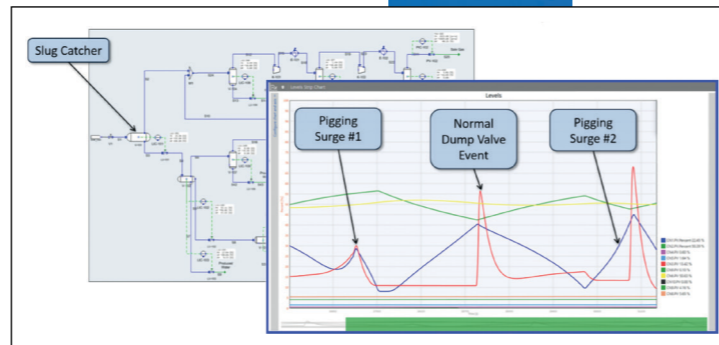
The Symmetry platform has consistent thermodynamics and fluid characterization methods that are used in both steady-state and dynamic engines from the field, pipe network, processing plants, and flare systems.

The Pipe workspace is equipped with industry-standard flow models including generalized multiphase mechanistic models like Petalas and Oliemans, superior mechanistic models such as OLGAS 2 and 3 phase interface, as well as the traditional empirical methods.



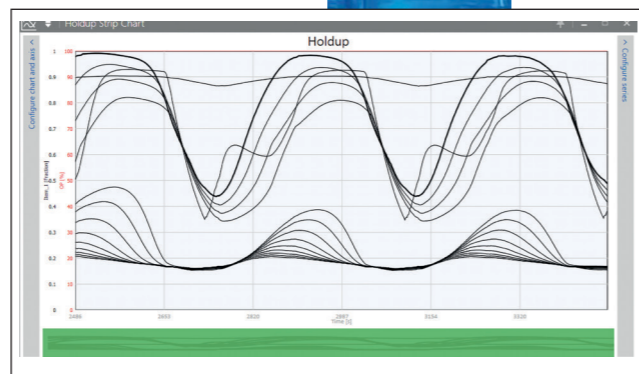
Pigging

- Insert pigs directly in the pipeline or through the pig launcher in the dynamic model.
- Track pig location and velocity throughout the gathering system/network.
- Predict liquid holdup and pressure loss as pig proceeds down the pipe and sweeps liquid ahead.
- Pig one or multiple pipes—there's no limit to the number of pipes in a network that can be pigged.
- Analyze different mechanisms to mitigate large liquid slugs leaving the pipeline into the downstream slug catcher, including detailed control schemes.
- Use Scheduler block to develop a pigging schedule for pipelines at regular intervals.



Slugging

- Calculate liquid holdups and slugs induced by elevation/ terrain changes in pipelines— important for configurations such as risers.
- Calculate slugging based on flow rate and operational conditions (e.g., turn-up slug).
- Monitor the formation and burping of liquid slugs in pipelines.
- Evaluate slug catchers based on liquid slugs/holdup.
- Slug mitigation measures assessment (topside choking, gas lift, etc.)

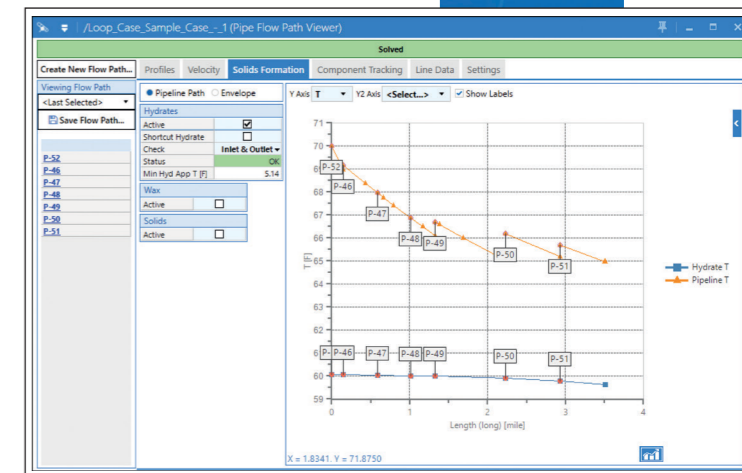


Flow Correlations

- Generalized multiphase mechanistic models (Petalas, Oliemans, etc.)
- Available superior mechanistic flow models such as OLGAS 2 and 3 phase interface
- Traditional empirical methods (Beggs and Brill, Lockhart & Martinelli)

Flow Assurance

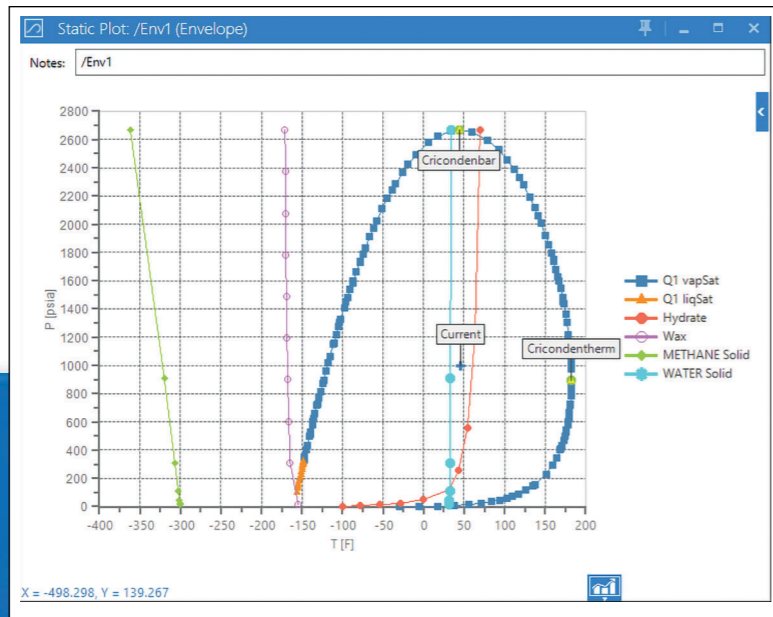
- Rigorous hydrate formation estimation with or without inhibitors
- Wax formation
- Erosional Velocity
- Solid formation
- Component tracking
- Extensive list of physical and transport properties
- Access to a comprehensive set of productivity tools: case studies, custom calculations in process calculators, and flexible plotting of virtually any variable



Fluid Characterization

The Symmetry platform contains a wide variety of fluid characterization methods for systems ranging from heavy oil to associated liquids produced with gas. Simulations may use a consistent slate of components regardless of the number of different fluids when using paraffins, isoparaffins, olefins, naphthenes, and aromatics (PIONA)-based characterizations. These types of fluids track the molecular structure of the different sources, which allow for consistent property estimation when material is blended.

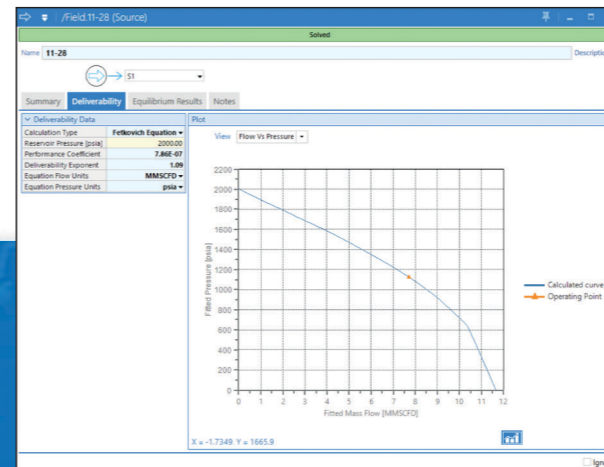
The data required to define a fluid may be as detailed as an extended Cn analysis combined with other information such as viscosity or density data. There are also options to characterize fluids with a reduced set of properties such as specific gravity, gas oil ratio, and water cut.



Well Deliverability

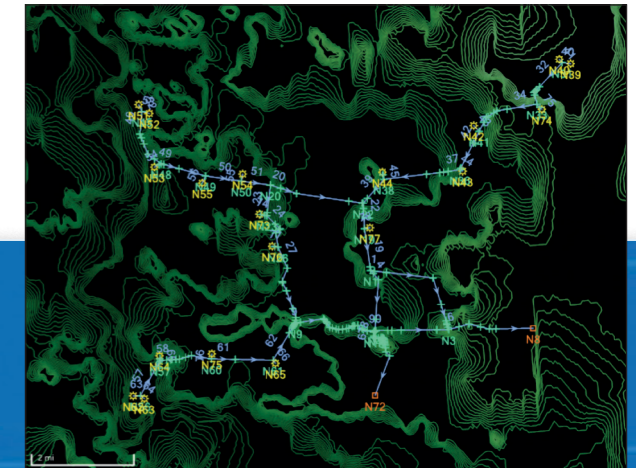
Well performance can be modeled using the Deliverability option, which enables you to input a relationship between well flowing pressure and well production rate.

- Tabular data (Q versus P)
- Linear relationship
- Fetkovich equation
- Vogel equation



Pipe Network Creation

- Build a network using terrain details based on digital elevation models (e.g. DEM files)
- Build pipe network models from shapefiles
- Resolve inconsistencies and connectivity issues using the network connection tool





Symmetry

Tailored workspaces—optimized facility

Process Software Platform Pipe Workspace

slb.com/symmetry

*Mark of Schlumberger
Other company, product, and service names
are the properties of their respective owners.

Copyright © 2020 Schlumberger. All rights reserved. 19-IS-000003

Schlumberger