KBC

A Yokogawa Company

Petro-SIM®

with Multiflash & Maximus

Advanced Process Simulation for Upstream & Midstream

Petro-SIM is the only simulator purpose-built for oil and gas facilities that combines advanced process simulation with modern technology. Integrated with Multiflash® technology, it offers leading compositional PVT simulation and robust thermodynamics that can handle multiple fluid and solid phases, including ice and hydrates.

Using the thermal hydraulic network simulator within Maximus® software, Petro-SIM models life-of-field production systems, from reservoirs and wells to pipelines and production facilities, including carbon sequestration pipelines. Petro-SIM technology ensures long-term processing facility performance tailored to reservoir needs that provide solutions for upstream and midstream operations.

Bringing DECARBONIZATION to Life®

Petro-SIM's Core Simulation Capabilities for the Upstream and Midstream Hydrocarbon Industries

Date-Based Simulation

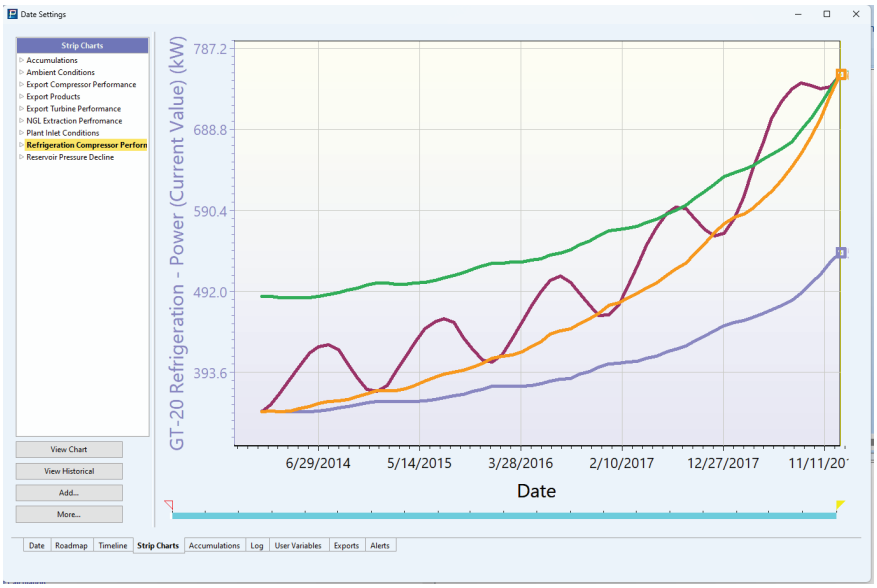
Petro-SIM is the first process simulator to allow date-based modeling that enables you to run a steady-state model at different points in time using different sets of time-dependent input data. It supports seamless activation of alternative facilities for equipment change-outs or debottlenecking within a single model, simulating scenarios over days, months, or years. Key process variables can be tracked, with cumulative results and time-weighted averages calculated, offering insights into life-of-asset economics.

Life-of-Field Integrated Asset Modeling

The Maximus Hydraulic Subflowsheet (MHS) integrates thermal hydraulic and compositional rigor for precise, field-wide performance predictions. It provides realistic, steady-state modeling for crucial decision support, combining Maximus production models with high-fidelity Petro-SIM simulations. This Integrated Production Model (IPM) enables realistic design margins and lowerCAPEX to facilitate faster and more accurate decisions.

Maximus – Petro-SIM – Multiflash Advantage

Using an IPM with Multiflash's verified and accurate PVT/compositional data and applicable equation of state methods provides a consistent basis for production and processing simulation. This can only be achieved using KBC's Maximus and Petro-SIM technology along with the Multiflash superior thermodynamic basis.



Investigates the impact of time-dependent variables such as changing process feed flow rate, gas quality, and seasonal ambient air temperature based on gas turbine performance.

In this example case, the refrigeration load factor increases from 65-75% during Year 1 to 95-105% during Year 5 of operation.

Cumulative and time-weighted average values of feeds, products, fuel gas consumption, and energy consumption throughout the Life-of-Field study allows for quick evaluation of alternatives to maximize production and achieve optimum NPV.

Multiflash Native Integration and Flow Assurance Analysis

Petro-SIM's native integration with the Multiflash fluid package methods allows you to complete flow assurance studies directly inside process simulator models. Advanced hydrate prediction and hydrate inhibition modeling can be completed using the superior CPA-EOS. Other natively supported Multiflash fluid package methods include GERG 2008, RKS (Advanced), RKSA (Infochem), and more.

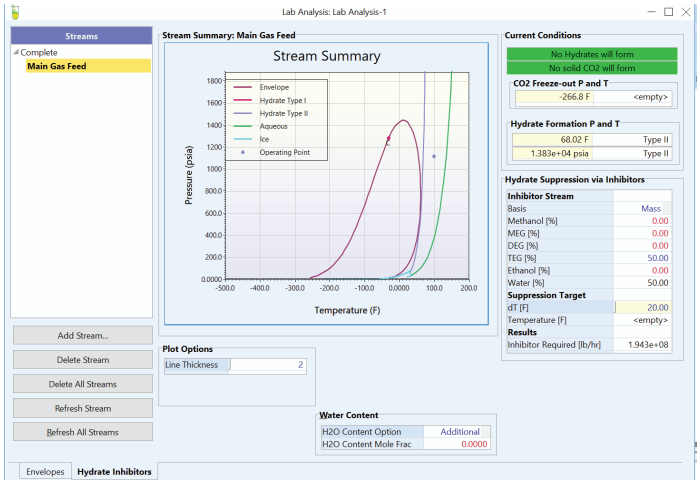
Using Multiflash software, the rigorous n-phase thermodynamic flash calculations allow for all fluid and solid phases to be modeled. Solid phases such as ice, hydrates, waxes and asphaltenes can be predicted in addition to the typical vapor, liquid hydrocarbon, and aqueous water phases. All phases are correctly represented in the Petro-SIM PFD simulation environment.

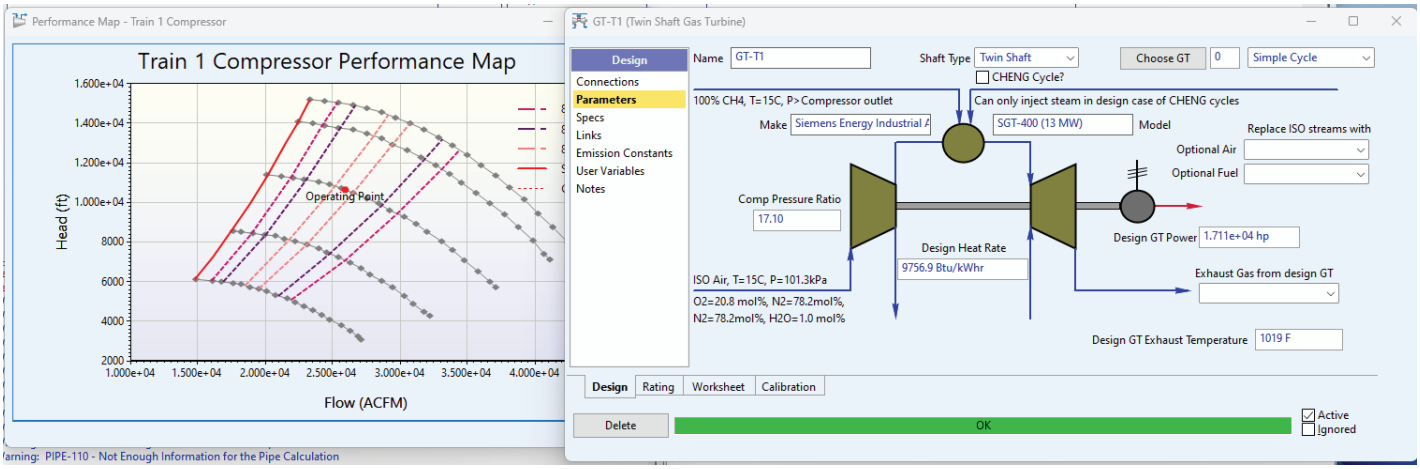
Lab Analysis Graphical Interface

Petro-SIM's Lab Analysis interface streamlines hydrate risk assessment and mitigation. Using CPA-EOS, it quickly identifies hydrate formation risks, visualizing phase boundaries and operating points. The tool allows for easy addition of alcohols and glycols to inhibit hydrates without altering the flowsheet, supporting rapid development of mitigation strategies.

Lab Analysis also visualizes solid wax, asphaltene, and CO_2 formation on phase diagrams. Configurable workflows automatically detect wax and asphaltene risks, highlighting affected streams on the process flow diagram and generating warnings. Rigorous n-phase flash calculations identify solid phases, quantities, and compositions.

Users can analyze individual or grouped streams, plot critical properties, and test inhibitor strategies, with clear reports on required quantities to prevent hydrate formation.





Gas Turbine and Compressor Technology

Petro-SIM's flowsheet includes rigorous single- or twin-shaft gas turbine units with automated combustion models. It calculates isentropic efficiencies, air and fuel flow rates, and accurately estimates CO_2, CO, SO_X, and NO_X emissions. The units support gas, liquid fuels, and hydrogen-ammonia blends for decarbonization studies.

Compressor units offer multiple performance curves and maps, visualizing performance against surge and stonewall limits. Combined, the turbine and compressor models enable precise simulation of compression system performance, power limits, and operating envelopes. This ensures accurate accounting of fuel gas consumption, supporting comprehensive material and energy balance calculations for the entire compression process.

Third-Party Technology

Petro-SIM software integrates with leading third-party technology for other hydraulic modeling vendors and software including:

- Schlumberger PIPESIM™ for steady state integrated production modeling.
- Schlumberger OLGA™ software and Billington Process Technology OLX™ link for dynamic integrated production modeling.

Unique Focus

Quality. Innovation. Support. Value.

Our industry-leading consulting and world-class technical support, available under maintenance agreements, ensure diverse clie nt needs are met. Purpose-built with industry-relevant technology, Petro-SIM maximizes asset value, empowering confident, informed decisions to enhance facility performance.