PEMEX, the national oil company of Mexico, faced uncertainties surrounding fluid arrival volumes and product quality at its main marine terminal, making it difficult to consistently achieve crude oil export specifications. The terminal handles 70% of the company’s total production, receiving wet crude from offshore platforms through four pipelines.

Fluid arrival rates were estimated from flow and water measurements undertaken offshore, as well as steady-state volumes balances. This did not account for the packing and unpacking behavior of oil and water phases in the pipeline. As a result, the volumes reported from the processing facilities for crude stabilization were often significantly different from production estimates.

In addition, water storage and processing capacity at the terminal are limited. Without the ability to predict water slug arrival at the terminal, the decision whether to send fluids directly to the shipment point or the storage tanks to separate water and oil became a challenge. As a result, achieving crude quality for export on a consistent basis proved difficult, incurring frequent contract penalties for the company.

"The new combined measurement and prediction system allows us to make timely, accurate, and agile decisions to maintain the quality of our export crude oil, evidenced by a 90% reduction in contract penalties."

Luis Fernando Lopez Cisneros
Senior Technical Specialist
PEMEX
**CASE STUDY:** Avocet platform and OLGA simulator help cut contract penalties by 90% in Mexico

**Combined software solution**

An integrated solution was designed, combining the Avocet platform—where production information could easily be manipulated, visualized, and stored—with the OLGA simulator to create a new pipeline model.

Hydraulic and product quality conditions were generated by the combined system, enabling real-time operational monitoring. Based on this, predictive simulations were run, forecasting future operating conditions such as shutdowns, restarts, packing, and unpacking. PEMEX could now predict fluids not meeting export specifications using the oil quality tracking function—monitoring water content, salinity, and oil API gravity throughout the production system.

Predictive simulations also informed production scenario planning, detailed analysis of specific behaviors, preparation of operating procedures, and operator training.

**Meeting specifications**

By combining the Avocet platform and the OLGA simulator, PEMEX received accurate information on oil arrival rates and changes in water and oil pipeline inventories. It could also predict slug volumes, location, and arrival times—as well as product quality indicators such as density and water cut—up to 24 hours in advance. This enabled the company to monitor the impact on operations in real-time and optimally plan operations. As a result, PEMEX was able to export crude oil that consistently met specifications and reduce contract penalties for non-compliant oil deliveries by 90%.