KONGSBERG has launched the latest release of the LedaFlow® advanced transient multiphase flow simulator containing major new functionality for hydrate and wax modelling, in addition to significant core model improvements for low liquid loading and vertical flow.

**Major new functionality – hydrates and wax**

The new hydrate and wax functionality is the result of the LedaFlow Technologies DA funded solids transport and deposition research project. This project involved researching and implementing improved methods for wax deposition and the transportation of solids in fluids. The wax deposition model is based on methods developed by the University of Michigan. Wax deposition is treated as a non-equilibrium reversible reaction influenced by the WAT curve, diffusion of wax forming components in oil, surface area of wax particles and wetted wall surface area.

The hydrate formation model is based on a thermodynamically limited non-equilibrium reversible reaction that depletes/replenishes hydrate forming components and water based on sub-cooling with respect to hydrate curves and surface area of hydrate particles. For both models, formulation of fluid viscosity changes due to particle density is also available.

**Core model improvements – low liquid loading and vertical flow**

The results of the low liquid loading experimental campaign carried out by SINTEF have been used to make significant improvements to LedaFlow. The software can now more accurately predict the onset of liquid accumulation in cases with low liquid loading which is important for correct line sizing, slug catcher sizing and improved operating procedures.

The figure on the left shows the set-up for the vertical flow experimental campaign at SINTEF. Experiments, exclusive to LedaFlow, were performed to determine the onset of liquid loading and the liquid loading mechanism itself. This is relevant to predicting liquid loading in gas wells. In addition, experiments were performed to remove the liquid from the vertical pipe and also to investigate churn flow.

**Other improvements**

In addition to the major new functionality and model changes described above, LedaFlow 2.0 also brings the following main improvements:

- In built steam/water thermo package
- Database portability and backup
- Parameter sensitivity analysis
- Slug statistics module
- Flexible pipe wall

All of these improvements are provided as part of the standard LedaFlow licensing package and are provided as a free of charge upgrade to existing users with valid maintenance and support agreements.