Monday, March 10, 2008

Westchase Hilton • 9999 Westheimer
Social Hour 5:30–6:30 p.m.
Dinner 6:30–7:30 p.m.

Cost: $30 Preregistered members; $35 non-members & walk-ups

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by ***Robert Tscherny*** *and* ***Armin Kauerauf***
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How to Lower the Migration Risk using Basin Modeling: 3D Fluid-Flow

Fluid-flow modeling is in many cases the most challenging and time-consuming task in an integrated basin modeling approach. Because of this the chemistry and physics are often simplified in standard fluid-flow modeling workflows. Compositional changes and variation of dependent physical properties, such as viscosities and densities, are not often taken into account. The standard approach for fluid-flow modeling often includes bulk petroleum or one oil and one gas component and using methods such as the black-oil models for chemo-physical description. The black-oil model is based on two pseudo components describing predefined properties. Using predefined properties reduces the predictive ability of fluid-flow modeling significantly because it forces the model to a decisive (and predefined) outcome. However, it is well known that accurate modeling of the reservoir fluids' densities is not only necessary for API gravity prediction but also for break-through analysis. Thus compositional effects cannot be neglected in general in migration modeling.

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One way to increase the predictability in fluid-flow modeling is to use multi-component description together with flash calculations to describe the fluid during all stages of migration. This analysis must include all stages of migration from expulsion, secondary migration, entrapment and breakthrough to dismigration.

This talk will show and compare an implementation of multi-component methodologies into fluid flow algorithms. The modeling methods used are

1. Darcy flow modeling;
2. ray-tracing-based flow modeling;
3. a combination of Darcy flow and ray-tracing (hybrid); and
4. invasive percolation.

Focus is put on multi-component implementations of these methods. The same PVT-analysis algorithm is applied in all models. This enables better comparison of the fluid flow methods themselves. A result from a case study clearly shows the necessity of applying multi-component fluid flow modeling with advanced PVT-property prediction as a "standard" method. This example shows the advantages and disadvantages of the individual methods, although statements concerning the superiority of one method compared with another cannot be made because each method has its own advantages and disadvantages. ■

Biographical Sketch

Speaker bio was not received prior to publishing. Please check website for additional information.