

*Hans Axel Kemna*

*Director of UCON Geoconsulting,  
Cologne, Germany*

*Monika Majewska-Bell, Keith Mahon,  
and Kristijan Kornpohl*

**Re-Scheduled Talk**

**This presentation was originally scheduled for October 27, 2008 but was postponed due to a conflict. The talk will be presented on Monday, February 16, 2009.**

# Structural Restoration and Petroleum Systems Modeling of the Wyoming–Utah Thrust Belt

An approximately 160-kilometer (99 mile) long 2D section of the Wyoming-Utah thrust belt and the Wind River Basin, including the La Barge and Tip Top gas fields, has been modeled using the advanced technologies of structural restoration and petroleum systems modeling. The model is based on publicly-available data. Due to the highly complex tectonic history of the area, characterized by extensive thin-skinned thrusting as well as basement-involved flexural movements, a detailed structural restoration was carried out using the software package 2DMove.

The structural restoration accounts for lateral sediment transport, i.e., erosion and re-sedimentation, and flexural isostasy effects.

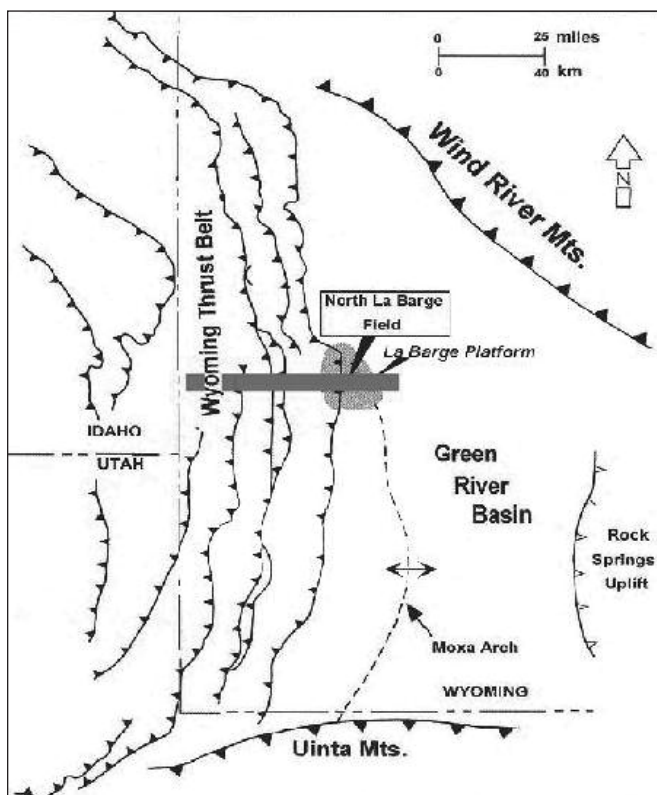
A petroleum-systems model was created using the paleo-geometries derived from the structural restoration. Modeling of the temperature/pressure history, as well as maturation and petroleum migration, was carried out using the TecLink application of the PetroMod software package.

The resulting model provides detailed insight into the history of the petroleum systems in the area, with a special focus on the La Barge and Tip Top gas fields near the eastern margin of the Wyoming-Utah thrust belt. Several petroleum systems, and a source of CO<sub>2</sub>, occur stacked in this area. Detailed migration simulations with source rock tracking revealed that the occurrence of gas and condensate can only be explained with the presence of very effective sealing lithologies.

The combination of structural restoration and petroleum systems modeling is a very powerful tool for the analysis of petroleum systems in tectonically complex environments. An approved workflow has been established for this purpose. ■

**Biographical Sketch**

DR. HANS AXEL KEMNA (email: hansa-  
ucon@web.de) is the Director of UCON  
Geoconsulting and an independent consultant in petroleum systems analysis in Cologne, Germany. Previously, he was a geologist and petroleum systems analyst with Integrated Exploration Systems GmbH in Aachen, Germany. He was a lecturer at the Institute of Geology, University of Cologne, Germany and held positions as a geological consult-



Map of the area with location of the section ( after Knight et al., 2000, modified.).

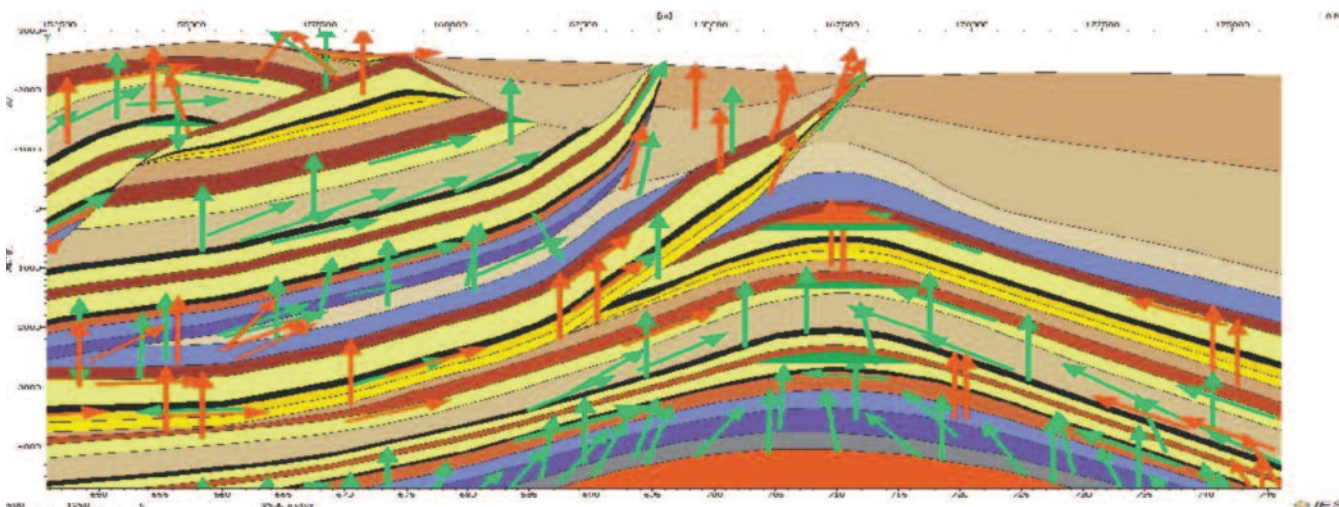
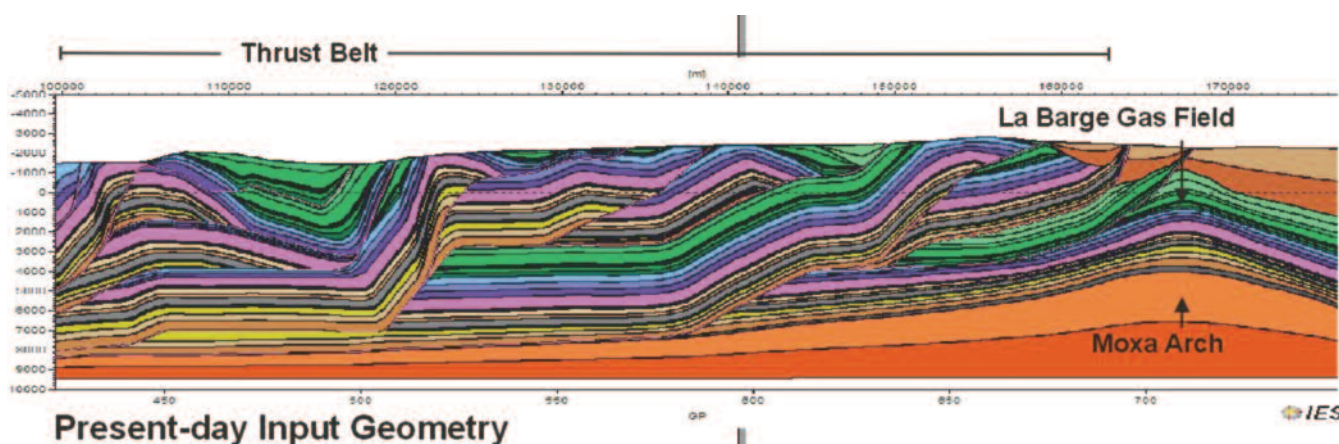
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ant for Redco NV, Kapelle o.d. Bos, Belgium, a consultant with S & F Advisory Services in Bonn, Germany, and a geological consultant for M & P GmbH in Neuss, Germany.

Dr. Kemna has been involved in 2D and 3D modeling projects in numerous basins in Brazil and is currently working for a service company on a project related to petroleum systems analysis and risk assessment of offshore Brazilian basins. He has conducted basin/petroleum systems modeling,

sensitivity and risk analysis for projects in Angola, Argentina, Australia, Brazil, Canada, China, Egypt, Japan, Malaysia, Sudan, USA, and Venezuela. He has published articles in *Eclogae Geologicae Helveticae*, *Quaternary International*, and *Netherlands Journal of Geosciences / Geologie en Mijnbouw*. Dr. Kemna earned his PhD in quaternary stratigraphy and undergraduate degree in geology from the University of Cologne.

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**Simulation Output: Petroleum migration (vectors).**