



**Advanced Resources
International**

Numerical Modeling and Reservoir Simulation for Sorbed Gas Reservoirs

About the Course

This one-day short-course will cover the basic concepts and practical application of numerical modeling and reservoir simulation for sorbed gas reservoirs - coalbed methane and gas shales. The course will review the theories of gas storage and flow, and how they are numerically represented in simulation models. The practical application of both dual-porosity and triple-porosity models will be covered, as will permeability modeling and multi-component gas sorption/diffusion. In addition, the utility of geostatistical methods for reservoir characterization will be presented, as well as evolutionary strategy methods for optimized history-matching. Finally, the application of integrated Monte-Carlo and reservoir simulation for probabilistic production forecasting will be covered, and how these results can be used for sensitivity analysis. The concepts and methods presented will be demonstrated through a variety of actual field examples that include single vertical production wells, multi-well and multi-seam field developments, multi-branch horizontal wells, and enhanced recovery projects using CO₂ and/or N₂ injection.

Who Should Attend

The course is designed for anyone that performs or relies upon numerical modeling and reservoir simulation for project decision-making.

Course Outline

- Theory of gas storage and fluid flow
- Differences and applications of dual- vs. triple-porosity models
- Enhanced coalbed methane recovery and multi-component sorption/diffusion
- Dynamic permeability models
- Application of geostatistical methods
- Optimized history-matching for model calibration
- Integrated reservoir/Monte-Carlo simulation for probabilistic performance forecasting
- Parameter sensitivity analysis
- Case studies

About the Instructors

Scott Reeves is the Executive Vice President of Advanced Resources International, Inc., a research and consulting firm specializing in non-conventional gas, enhanced oil recovery and carbon sequestration. He provides technical consulting and advisory services to clientele throughout the world, and performs research on behalf of the U.S. Department of Energy, industry consortia and others. Scott has published over 150 articles, papers and consulting reports. He was a 2002/2003 SPE Distinguished Lecturer on Enhanced Coalbed Methane Recovery. Scott received a BS in Petroleum Engineering from Texas A&M University and an MBA from Duke University.

George Koperna is a Project Manager with Advanced Resources International, Inc. in Arlington, Virginia. He possesses over twelve years of experience providing a broad range of engineering design, field supervision and technical analysis for work related to desorption-controlled reservoirs, such as coal and organic shale. He has a strong understanding of reservoir simulation and evaluative modeling, which have been employed in history matching efforts and predictive simulations for the production of coalbed methane and shale-gas as well as for enhanced coalbed methane recovery. He has presented several short courses on coalbed methane technology. George received his BS and MS degrees in Petroleum and Natural Gas Engineering from West Virginia University.

Dr. Reinaldo Gonzalez, an applied mathematician with more than 15 years experience in the oil industry and over 20 years of academic experience, is a Senior Consultant with Advanced Resources International, Inc. (ARI) in Houston, Texas. Prior to working for ARI, Dr. Gonzalez was an independent consultant for the Venezuelan national oil company (PdVSA) and an Associated Professor at Universidad Central de Venezuela (UCV). His experience includes reservoir characterization, geostatistics, and the application of advanced mathematical solutions to oil industry problems. He holds a B.S. in Mathematics from the "Universidad Simon Bolivar" and a PhD in Mathematics from UCV.