

Editor’s Note: Dean Rietz recently finished his one-year term as an SPE Distinguished Lecturer. Last year, a 36-member Distinguished Lecturer Committee with representatives from each SPE region selected Rietz as a reservoir simulation expert. SPE describes the selection process as “rigorous and long”. Rietz delivered his presentation, “Incorporating Numerical Simulation into Your Reserves Estimation Process: A Practical Perspective,” at several locations worldwide.

It was truly an honor to be chosen as a 2016-2017 Society of Petroleum Engineers Distinguished Lecturer (DL). I began my first of four tours in October 2016, starting with a lecture in Japan. This first tour consisted of 19 stops in 18 cities and seven countries. In total, my year-long commitment consisted of 45 travel segments, with stops and overnight stays in more than 30 cities and 16 countries throughout the world. SPE and its travel partner did a phenomenal job handling the logistics, including all of the travel arrangements.

The experience itself was daunting at the beginning, but in the end, it was very rewarding. I met a lot of people of different cultures and backgrounds and visited many different regions. If you have an opportunity like this, I would encourage you to do it.

Throughout my career, my focus has been on reservoir engineering and reserves evaluations with an added interest on reservoir modeling. I have authored/coauthored several SPE papers discussing reservoir simulation and the reserves process. Concepts and ideas from these papers, as well as other experiences, were the basis of my DL presentation.

The lecture revolves around the concept that reservoir simulation is a sophisticated technique of forecasting future recoverable volumes and production rates that is becoming commonplace in the management and development of oil and gas reservoirs, small and large. Also, calculation and estimation of reserves continues to be a necessary process to properly assess value and manage the development of an oil and gas producer’s assets.

These methods of analysis, while generally done for various purposes, require knowledge and expertise by the analyst (typically a reservoir engineer) to arrive at meaningful, reliable results. Increasingly, the simulation tool is being

incorporated into the reserves process. However, as with any reservoir engineering technique, certain precautions must be taken when relying on reservoir simulation as the means for estimating reserves.

I created this presentation with reserves evaluators and simulation experts in mind – to help them have a better appreciation of the nuances of incorporating simulation in the reserves process. My presentation highlights some of the important facets that should be considered when applying numerical simulation methods to use for, or to augment, reserves estimates. Primarily focusing on SPE-PRMS and guidelines of the U.S. Securities and Exchange Commission, I discuss examples where numerical modeling is mentioned.

For example, SPE-PRMS states, “Recovery can be based on analog field or simulation studies.” – PRMS Document – SPE/WPC/AAPG/SPEE, pp.20-21. The SEC guidelines introduce the concept of “reliable technology” where computational methods, such as reservoir simulation, are considered – Federal Register Final Rule, pp. 2190-2192.

Throughout my presentation, I focus on the observation that most simulation models are not built for reserves, but rather they are primarily built for field development and management purposes. Therefore, most models are not appropriate for reserves, particularly proved reserves, but may, in some cases, be augmented for direct use in the reserves process.

The main reason for this is that most of these “typical models” are built, based on the most likely in-place scenario, to consider the full range of development options. Therefore, these “typical models” are more akin to 2P or even 3P volumes, which would not be consistent with the limitations of a 1P-reserves scenario.

Even if the purpose of the model is for determination of 2P reserves, and the corresponding in-place volume is

consistent with 2P reserves, other factors need to be considered to be in compliance with the particular reserves guidelines. One such factor might be where reasonable (parameter) assumptions are built into the model or whether the volumes are considered discovered.

Furthermore, all of the projected volumes generated by the model must pass economic and commercial

producibility hurdles.

During my lecture, I provide specific examples from my personal experience where simulation was successfully used in the reserves process. I also described an acquisition evaluation for one of our clients, where I evaluated a seller-provided simulation model that was inappropriately incorporated into the reserves process. Throughout my career, I have encountered many

situations in which simulation was successfully used to augment the reserves process, as well as situations where simulation results were misused.

Since the presentation, including questions and answers, was limited to about an hour, I had to conduct it at a high level, but I hope the audience walked away with an appreciation for the areas to focus on, to arrive at meaningful and defensible estimates of reserves when using reservoir models.



Reba Devi, then program chairperson of the Society of Petroleum Engineers Duliajan (India) section, presents speaker’s gifts of tea and a small sculpture to Dean Rietz, SPE distinguished lecturer, last year.

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For background on the subject, Rietz and fellow staff members of Ryder Scott wrote three SPE papers devoted to this topic. They are listed as follows:

- “The Adaptation of Reservoir Simulation Models for Use in Reserves Certification under Regulatory Guidelines or Reserves Definitions,” (SPE 71430), 2001. It is intended to start a dialog.
- “Reservoir Simulation and Reserves Classifications-Guidelines for Reviewing Model History Matches To Help Bridge the Gap between Evaluators and Simulation Specialists” (SPE 96410), 2005
- “Case Studies Illustrating the Use of Reservoir Simulation Results in the Reserves Estimation Process” (SPE 110066), 2007

To discuss this topic further, please contact Rietz at Dean_Rietz@ryderscott.com or the manager of reservoir simulation, Miles Palke at Miles_Palke@ryderscott.com.