

Integrative opportunity planning

Shell seeks to reduce time without sacrificing understanding using a new software tool in front-end planning.

AUTHORS

Milko Binza Moussirou and Victor Koosh,
Caesar Systems

In its pursuit to move faster and lead the industry in global E&P technology, Shell Exploration and Production has targeted specific front-end planning processes for improvement to be aided by software technology. Computer software has aided simulation modeling of reservoirs for nearly a generation. While reservoir simulation has provided rich benefits, these have largely remained isolated in the reservoir engineering domain.

The company has now turned its attention toward integrative opportunity planning across all subsurface, surface, and economic planning domains with the use of commercially available business simulation software. This article describes how this business simulation software is being deployed at Shell and how necessary organizational workflow changes are being facilitated.

Managers at Shell targeted multiple areas for improvement, including these: (a) move faster, reducing turnaround time for making the “go/no-go” business case on a reservoir opportunity, and (b) adopt an integrative process for managing decisions beyond the reservoir and across the entire value chain.

Reducing planning time

International oil companies find themselves in an increasingly competitive environment. Time is critical, and integrative thinkers are a finite resource. Business simulation software enables faster model building and then compounds the speed effect by permitting variables to be easily changed and a new scenario produced

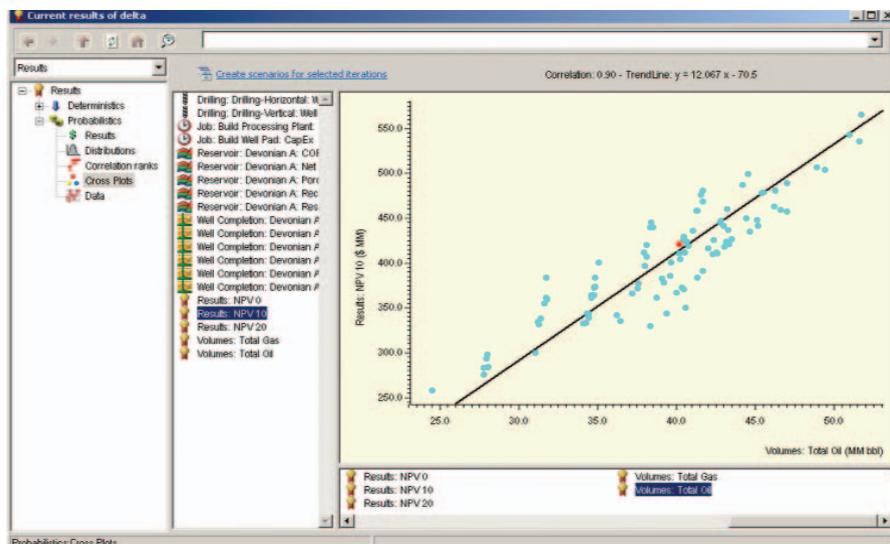


Figure 1. Crossplot displays enhance transparency and assist with QA/QC. (Images courtesy of Shell)

quickly. Opportunity analyses that once took as long as one week to revise can now be re-run in one day. A complete opportunity model that formerly took three to six months to develop can now be done in a month.

A business unit decision maker looking for the best price to win a bid for drilling rights may not have months to wait. The deal may not be there three months later.

A few years ago, a Shell manager calculated the cost of a spreadsheet model. It summed up to US \$100,000 in man hours and was not a sustainable investment because the engineer moved to another assignment. By comparison, on a similar project in Cameroon, a model built in business simulation software was reactivated after more than a year. It took two hours. The manager estimated that a spreadsheet model would have taken at least one week to reactivate.

Integrative opportunity planning

As an illustration, deepwater and ultra-

deepwater developments pose challenges not efficiently accounted for within each discipline independently. Basing the business case on optimistic reservoir production estimates without accounting for constraints on rig availability or the actual cost implications of water handling can lead to ugly surprises and a negative impact on economics.

To extend integrative planning beyond the reservoir, encompassing the entire value chain, Shell is implementing an approach to scenario planning using PetroVR business simulation software. “The key difference between the old spreadsheet approach and the integrative business simulation approach is that a reservoir engineer or a drilling engineer will now input his or her assumptions along with the data,” said Andy Breckwolddt, a team leader in Shell Development Planning. “Before, each discipline used assumptions to manipulate their data in spreadsheets and then provided conclusions for the economist to roll up into a summary model. Now,



Figure 2. The Confidence Curve depicts the ideal target point of planning resolution: time reduction, optimal clarity, and no sacrifice in understanding.

input from each discipline is transparent, the interdependencies are visible, and a team lead can see how changes in one domain will impact every other domain.”

Advanced business simulation software provides a common platform for analysis. Balancing production output with markets based solely on reservoir and production estimates can lead to an inaccurate view and incorrect priorities. In a textbook example, a team determines that gas field production will outpace limited markets. The forecasters have developed the gas volume predictions using a non-integrated, simple production profile roll-up that ignores such factors as infrastructure constraints, rig availability, and human resource limitations.

In the next round of planning, an integrative business simulation model is built, taking these dependencies into account, especially the pipeline flow constraints and the availability of drilling and workover rigs as well as the personnel to operate them. The integrated forecast reveals that rather than gas excess and limited markets, the company would face gas deliverability limitations and market over-commitments.

Shell managers and team leads like the transparency, intuitive layout of data, and the ease of quality assurance/quality control (QA/QC). Data from each discipline can be visualized and easily audited (Figure 1). By contrast, data buried in 50 linked spreadsheets is hidden and virtually not checkable.

Accommodating culture shock

Shell managers hasten to clarify that the evolution from compartmental technical modeling to integrative business modeling is more about people and workflow than it is about computer software. “Having robust software is essential to this transition, sure, yet the transition is one of thought process and workflow more than it is about what brand of software to use,” said Henk Wabeke, head of field development in petroleum engineering and development.

Change management is a long process. This evolution at Shell is progressing successfully largely because managers there have acknowledged and planned for it. These following discrete steps are essential, although not necessarily sequential:

Awareness presentations. The first step of buy-in tends to occur at the managerial and supervisory tiers. For this we offer a half-day Awareness Presentation that explores why Shell is adopting the new process, generally what it includes, and how the software will be used, including discussions and a software demonstration. The Shell objective, as previously described, is to reach confidence and resolution by reducing time without sacrificing knowledge (Figure 2). The Awareness Presentation occurs first among managers and supervisors and then among practitioners.

Practitioner training. Next, practitioners from each discipline (reservoir, drilling, economics, etc.) attend training sessions.

Taking a project workforce offline for training is a significant time commitment moderated by the expectation that numerous days worth of time will be saved in the new model-building environment. Practitioners delve into actual model-building exercises based on actual project data.

Support and coaching. Practitioners will ask, following the awareness presentation or the training, “This is fine and good, but can it help on my project where we have uncertainties not shown in your training model?” For this assistance, a veteran planning mentor has been designated whose primary role is to support and coach first-time users in integrative model building.

Data preparation. This critical and often overlooked step ensures that first-time users optimize their time in converting project data from extensive spreadsheets and other sources into the business simulation software. A typical failure mode is to force data from an old workflow into new tools. Dumping too much data indiscriminately can create just another monster. We stress the fact that the model to be built should be fit-for-purpose and help determine the appropriate data needed in each arena of the model.

Project framing. At the beginning of each model building exercise, key questions must be addressed in order to focus the time expenditures and the thinking of practitioners toward the most productive outcome: goals, objectives, value levers, etc. Decision theorists call this “framing.” Teams using integrative business simulation for the first time can benefit from the presence of a planning mentor to guide in the construction of the first business simulation model.

“At Shell we are about making better thinkers,” said Ken Blott, senior advisor to the company’s unconventional oil group. “Computer software is not the end; it’s the means. Shell is committed to deploying the best tools we can find in order to equip our people to be the best thinkers, best planners, and best operators in the business.” **ENR**