

## Case Study 1

### Auditable reserves reference database

#### Summary

A fast growing oil and gas company, with international operations, required a more secure and manageable reserves forecasting and auditing process. The aim was to allow the company's executives to quickly identify and approve reference forecasts that would be used for reporting, planning and control purposes.

#### The Challenge

As a fast growing company, the number of assets, asset teams and reservoir engineers boomed in recent years. Production and number of wells also grew rapidly making it harder to track and store reference production forecasts used for calculating the reported economic reserves.

Moreover, the variety of assets entailed the use of a range of forecasting methods from reservoir simulations to decline curves analyses. The auditing and aggregation of numerous production profiles generated by different means and stored in disparate locations under different formats made it even trickier to build the big picture and to control the process.

Executives at the client firm realised that improvements to their formal reserves calculations would certainly lead to improvements of their bottom line results.

#### Managing production profiles

Managing production profiles effectively and quickly is a source of competitive advantage for the producing firm. Effectiveness is created by the ability to combine, shift and change numerous production profiles for a large number of entities accurately, timely, securely and using the relevant inputs.

At any stage of the process, engineers need to have a good knowledge of the manipulations and calculations occurring and avoid unforeseen errors.

Spreadsheets, the usual tool utilised to carry out such tasks, fail to provide almost all of the requirements listed above.

Moreover, storage, security and workflow modelling are not supported by a simple spreadsheet model even though each one of them is important to the performance and profile of the firm

#### The solution

Our client, who have taken the lead in the use and development of Serafim Future®, have integrated the use of Future in their business process and as a result were aware of the benefits it can yield in such situations.

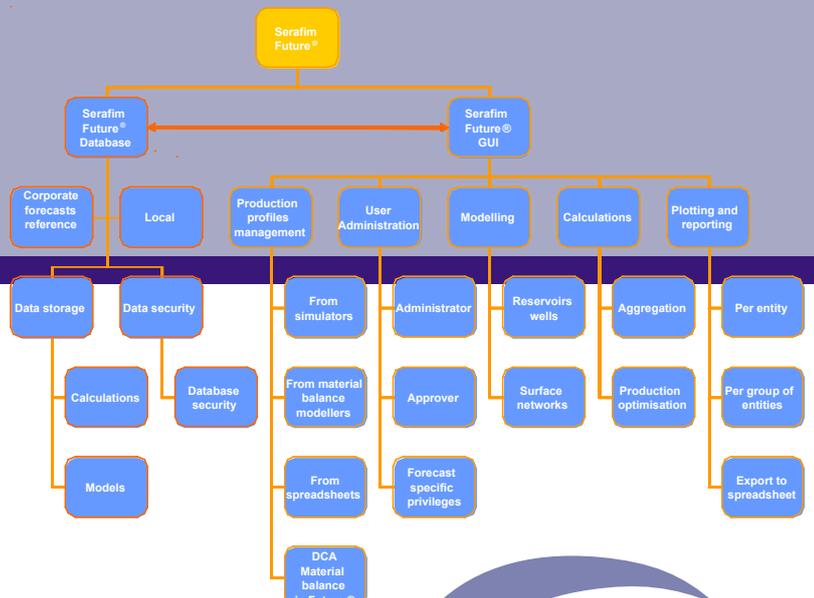
Future®, both the database utility and the software front end, provide a robust answer to the business challenge that our client faced. ♦

*Future®  
impact on  
facilitating  
the reserve  
audit  
process*

#### About Serafim Future®

Serafim Future is a software application and database developed by Serafim Ltd for handling of oil and gas production profiles. Production profiles generated by reservoir simulators, decline curve analysis or other methods can be imported, generated, aggregated, shifted and studied under different production constraints. Serafim Future is targeted at Reservoir Engineers who need to combine profiles from different sources, forecast future production, estimate reserves and study the effect of shared facilities constraints. Serafim Future can also be useful for asset managers and executives who need a secure and auditable reserves estimation system and a tool for field development planning and studying the effects of different development options.

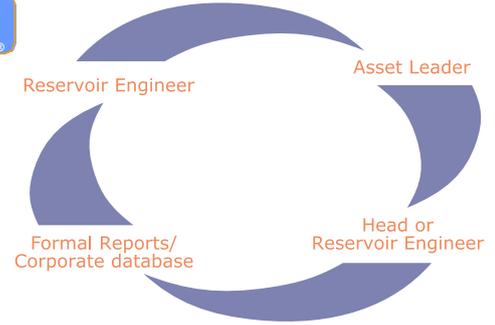




### Future®

- provides decline curve analysis for producing wells, including the innovative C-curve method
- allows gas production forecasting by decline curve, material balance or, for associated gas, by the free-gas:liquid ratio method
- imports the results of reservoir simulation or external material balance models
- allows one to work with a range (e.g. high, medium and low cases) of production profiles for each asset.
- aggregates well forecasts to field and platform level, applying, if necessary, production constraints, without the errors that so often creep into spreadsheets
- rapidly updates profiles with the results of changes in well start-up dates and drilling sequences
- stores all inputs and settings, so these can be audited
- produces reports listing differences in inputs and settings between two cases

Future® allowed the technical generation of the forecasts to be integrated into a standardised workflow, and provided tools for management of the workflow. Read and write permissions were specified per run. Forecasts were created, updated, approved and frozen so that no further changes were possible. Serafim Ltd is currently helping this client to create an even more versatile administrator control system that will allow the permissions and approvals to be specified at several layers - concession/asset/ field etc.

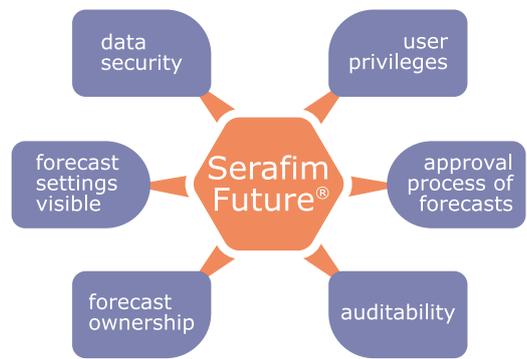


Even though our client set up a corporate Future® database on MS SQL Server, the software still allows a great deal of flexibility for users:

- Personal local databases that is directly accessible via either Future® software or utilities such as MS Access.
- Results and models from one database can be copied to the other.
- Reference approved or frozen forecasts can be used as the basis for new forecasts – such as for the next reserves cycle.
- Future® is equipped with utilities that allows direct communication with databases, such as Schlumberger OFM (production and well test information) and VOLTS (reserves reporting).

### Results

Our client reckons that the use of Serafim Future® allowed them to save two weeks of every engineer’s time per year just when using it throughout the reserves reporting exercise. The benefits of workflow management, security and reliability of data have been widely noticed, especially during official audits. ♦



**About Serafim Ltd**  
 SERAFIM Ltd specialises in applying mathematics and mathematical reasoning to understand and solve practical problems in engineering and software development.  
 From the development of innovative solutions to their final implementation in the form of high value-adding software, our work is based on the techniques used in scientific and mathematical research. We currently work predominantly in oil-field reservoir engineering and project economics. Our clients are oil and gas companies, oil-field service firms, governments and other consultancies.



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