

PICO Migrates to Petrel Reservoir Engineering, Significantly Cuts Simulation Time

Move improves productivity, collaboration, and reservoir management in El Zaafarana field

CHALLENGE

- Accelerate subsurface simulation run time
- Predict water breakthrough
- Improve production forecasting

SOLUTION

Migrate to Petrel* Reservoir Engineering, in four key stages:

- Data gathering
- Model initialization
- History matching
- Model validation

RESULTS

The new simulation model, based on Petrel Reservoir Engineering

- reduced run time from over four hours to just minutes
- improved well behavior analysis to identify rapid water breakthrough
- strengthened production forecasting to fully tap field reserves
- improved collaboration.

“Being able to speed up our simulation run time so significantly has really given us a productivity boost. In addition, Petrel Reservoir Engineering allows our team to collaborate optimally—regardless of experience level or seniority.”

Ahmed Hassan
Chief Reservoir Engineer
PICO International Petroleum



PICO International Petroleum—an independent exploration and production company—wanted to convert and upgrade its existing simulation model of the El Zaafarana field in Egypt to more accurately predict water breakthrough and improve production forecasting. This was for a mixture of performance and logistical issues. The simulator PICO had previously been using caused engineers to waste valuable time importing and exporting data for visualization.

The existing simulation model was also running too slowly, despite efforts to work around the problem by substituting the model’s local grid refinement (LGR) with up-scaled critical water saturation.

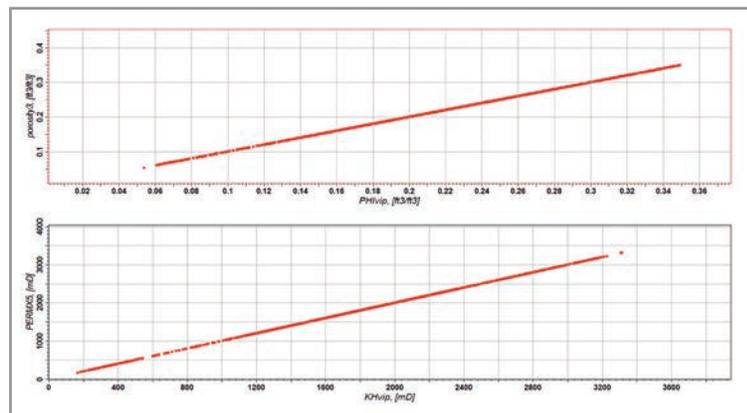
PICO hoped to overcome this issue, improve simulation runtime, and increase productivity by moving to Petrel Reservoir Engineering (RE) software to drive their simulations in the ECLIPSE* industry-reference simulator. In addition, the proposed move would enable PICO to collaborate better—both internally and with its partners already using the software.

Four-stage migration plan

After meeting with Schlumberger to discuss requirements and logistics, it was decided that the shift to Petrel RE would be undertaken in four stages: data gathering, initialization, history matching, and model validation.

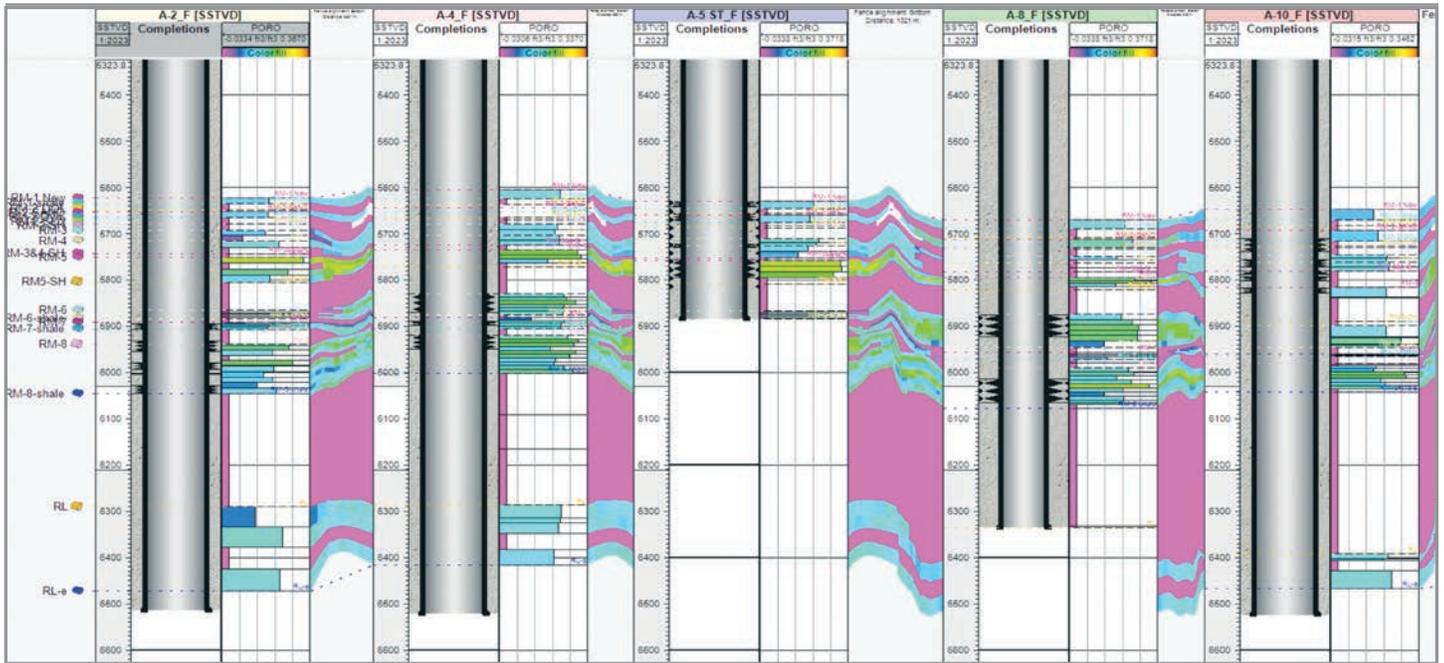
The first stage saw the team gather and validate existing simulation data files for transfer into Petrel RE. The files were examined and smoothed where necessary, to further improve simulation runtime, while honoring key reservoir characteristics. Next, the team established a workflow to import properties from the old model. The existing grid was exported by first traversing in the J direction with a different grid origin, and then importing the properties onto the Petrel grid.

To ensure that the properties had been correctly imported, comparisons were made with the array loaded in Petrel RE. The porosity and permeability array showed an excellent match, verifying that the migration workflow was successful.



Porosity and permeability array comparison verified the migration workflow was successful.

CASE STUDY: Petrel RE improves productivity, collaboration, and reservoir management in El Zaafarana field, Egypt



Simulation data files were gathered and validated, ready for transfer.

A new model of the El Zaafarana field was initialized in the ECLIPSE simulator and compared to the base case for validation. The team then recreated all local grid modifications made in the original model in Petrel RE, and carried out history matching from the start of production in 1995 through 2010. The model was also fine-tuned to improve the matching quality.

Finally, newer production data was used for validation once a reasonable history match was obtained. Data going back two years was compared against model results for the same timeframe.

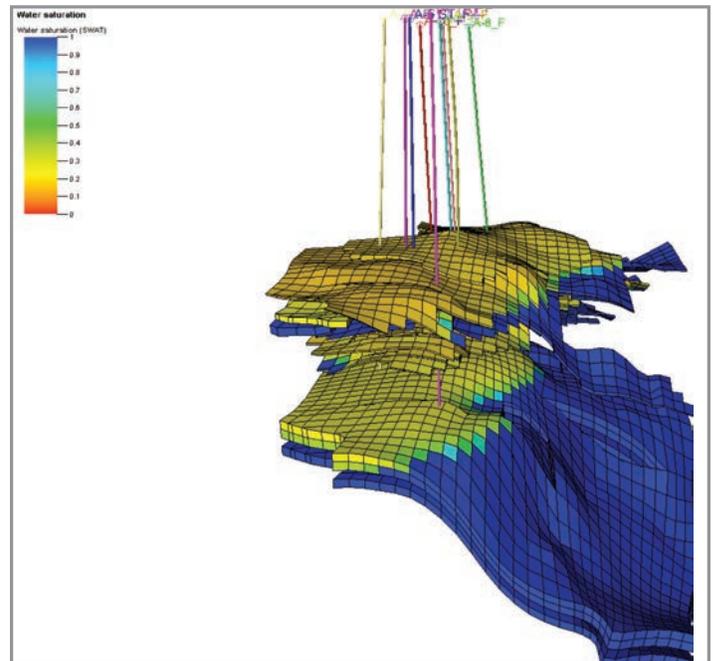
Fast, efficient simulation

Working from fine-tuned and smoothed data inputs, the new simulation model significantly accelerates simulation run time from over four hours, to just minutes, driving related process and workflow efficiencies. It also seamlessly integrates the static and dynamic models, preserving simulation geology. Finally, engineers no longer have to spend time importing and exporting data for analysis.

Using the powerful visualization capabilities delivered by Petrel RE, PICO engineers can track, analyze, and stem rapid water breakthrough—as well as improve production forecasting to fully tap field reserves.

In addition, Petrel RE provided the PICO teams with much improved collaboration capabilities, and ensured continuity with incoming graduates who used the software at university.

E-mail sisinfo@slb.com or contact your local Schlumberger representative to learn more.



Field model initialized in the ECLIPSE simulator.

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