

# Infill and Sequencing Simulation Study



# Predictive Analytics

Acceleration from a one rig program to a greatly increased wells/year count, multi-rig program is inherently complex

In the absence of analytics, it is likely that “easy” wells will be chosen first, “hard” wells chosen later

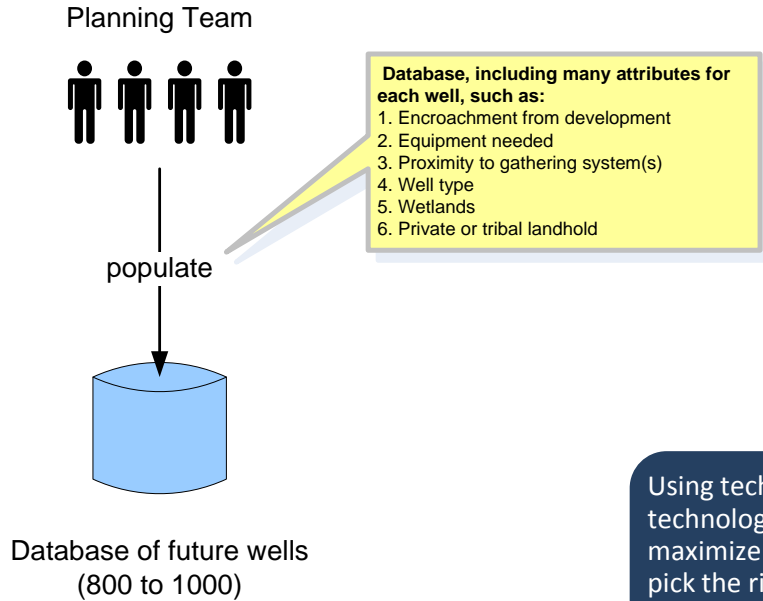
This is not likely to be the optimal economic sequence, however

# The general idea is to allocate funds so as to maximize oil production and profits

In addition to maximizing oil production and profits in a planning period, we also seek to maximize the Net Present Value of the wells that are brought into production in the planning period. Each well, once drilled, adds to the Net Present Value. How much value it adds depends on how much it produces. This value is computed by simulation from a probability distribution. Adding to the uncertainties in the simulation are the obstacles, risks, competing objectives, fluctuations in the amount of resources available in later quarters, variations in the mobility of rigs from site to site, etc., associated with the project.

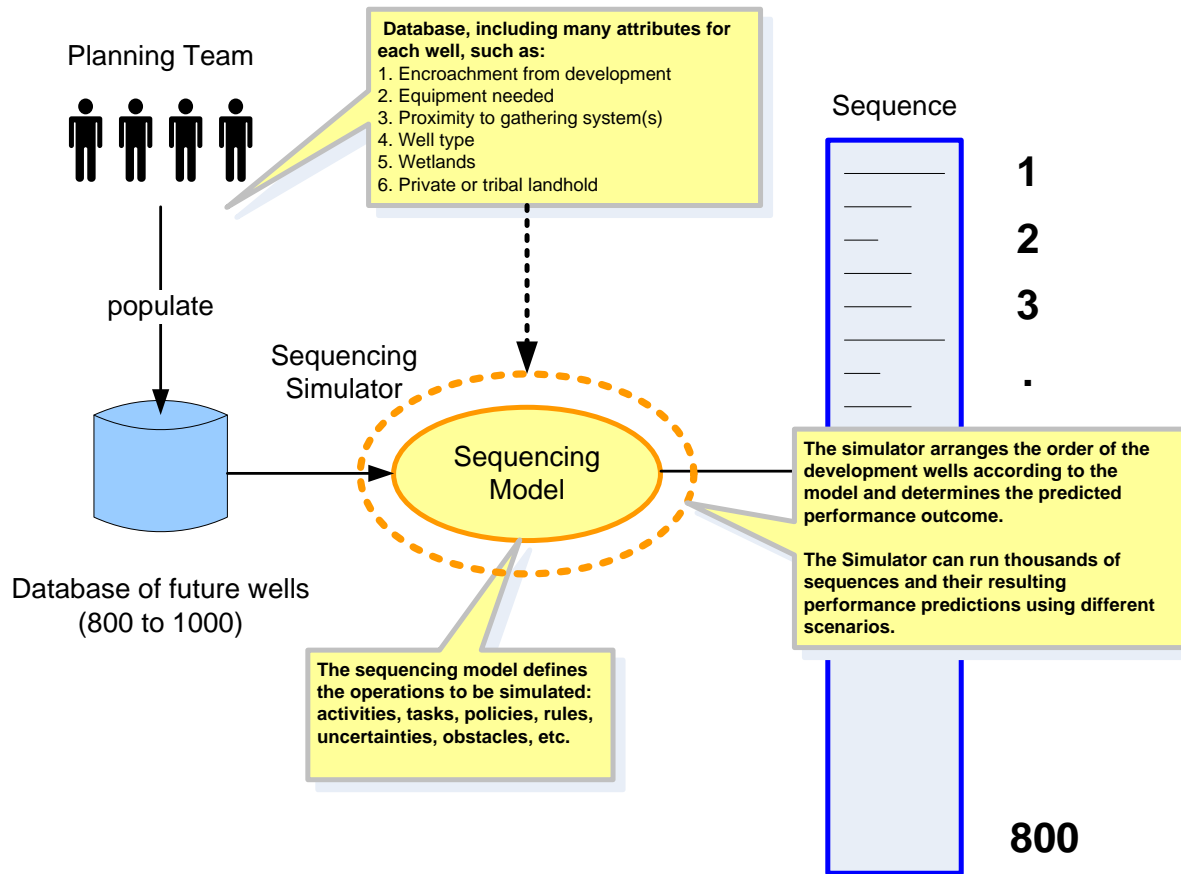
Money is made in the simulation by drilling sites with rigs, and increasing the Net Present Value if good wells come in. The objective of the simulation is to determine, under uncertainty, the sequence of the wells that yields the best expected economic value.

# Sequencing Model Concept

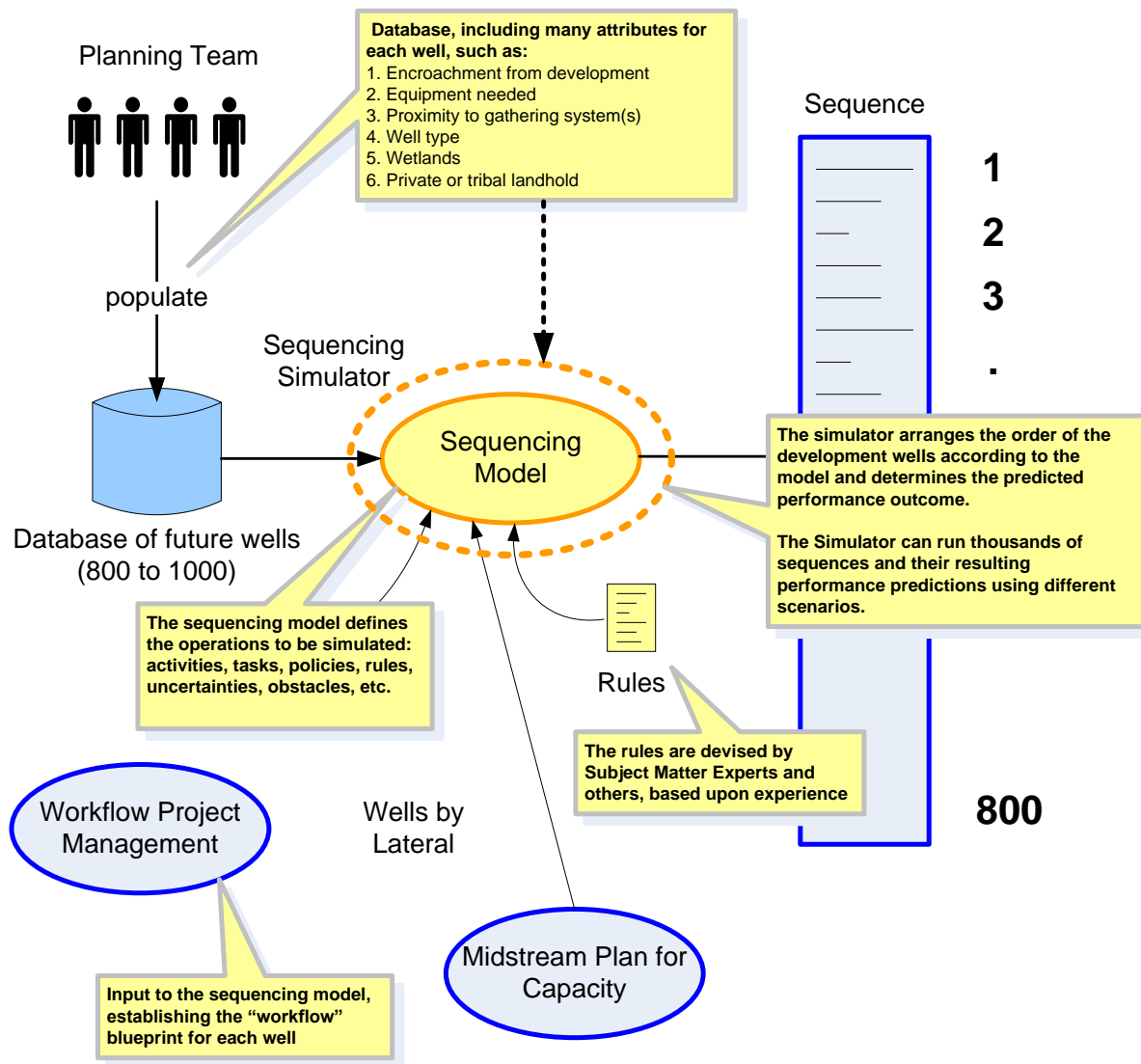


Using techniques based on Complex Systems technology, a simulator enables operations to maximize the number of wells which can be drilled, pick the right sequence of locations to drill, adjust schedules as changes occur, and ensure that the resulting oil production meets or exceeds forecasts.

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# The Codified Sequencing Model Concept becomes an Operational Process Simulator

The simulation model's primary objective is to determine the well sequence that best achieves the stated objective(s), given the "rules" for sequencing wells.

The rules are constructed by subject matter experts based upon heuristics (a common sense set of rules developed through experience).

The simulation allows for experimentation in a "what if" manner...rules can be changed, along with scenarios. In this way the model can be a centerpiece of the Strategic Planning effort.

The simulation can be enhanced to include risk and uncertainty in the model with respect to the certainty of each action item

The model of the drilling program can be run dynamically – changing in time as each well is drilled

The sequence of the well and also the timing of the wells (how many drilled simultaneously, time interval between wells, overall duration of program) is taken into consideration.

The simulation model is scalable – number of rigs, number of wells, different objectives, barriers, enablers, work flows – all can be done with minimal modification to the model.