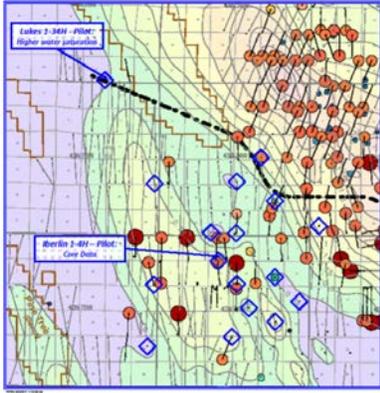


Systematic Approach to Completion and Exploitation Optimization – Horizontal Well Example



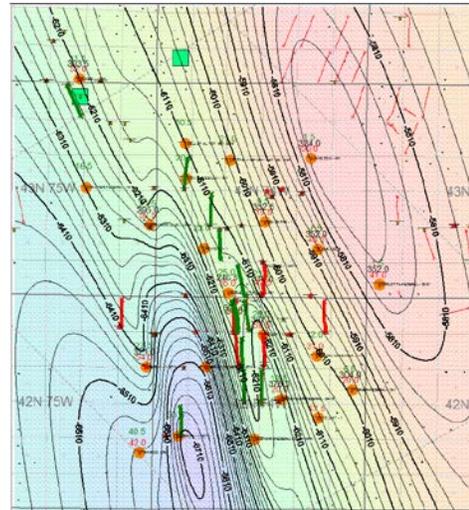
History

The operator has drilled several wells in the acreage. The wells are horizontal with a typical 4500 ft lateral length. On the average the wells are completed in 14 stages with every stage fracked with 250,000 lbs of proppant and 4200 bbls linear gel, in the average. The proppant concentration is ramped up from 0.5 ppg to 6 ppg during pumping. The goal of the study is to examine sensitivities to completion parameters to investigate possible improvement in fracture conductivity and complexity. Furthermore, utilize a geomodel enriched with fracture attributes, wellbore architecture and constrained production, to ascertain possible recovery in high, medium and low cases. In the end, to run economics and estimate a value for possible listing for sale.

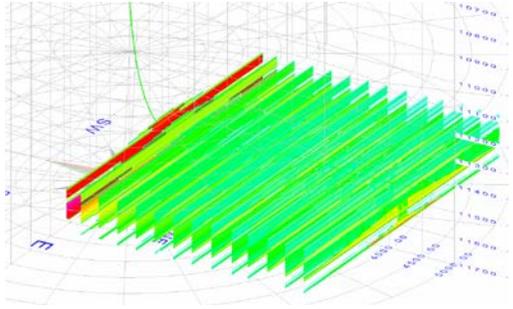
Problem

The various steps of the project are as follows:

- ✓ Model Completion Design
- ✓ Optimize completion Design
- ✓ Build Petrophysical and Geomodel
- ✓ Import data in Dynamic Model and HM
- ✓ Run sensitivities to spacing, horizontal length, completion strategy etc.
- ✓ Forecast and estimate EUR and Economics



ActiveReservoir



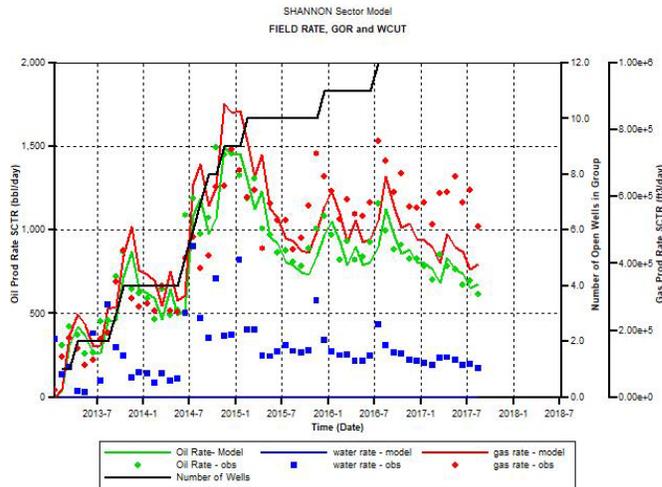
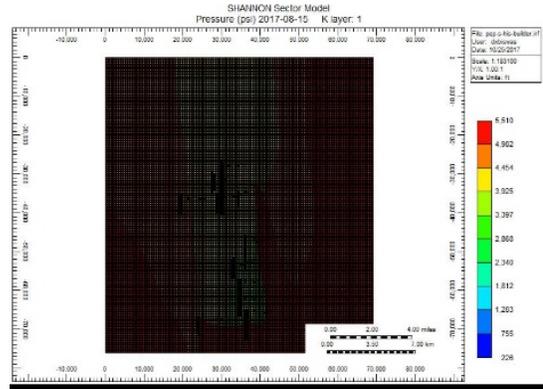
Diagnostics

A fracture simulator is used to first model the fracture stages. The various fracture attributes e.g. fracture width, baseline conductivity, proppant concentration distribution etc. are compared for the different stages. Possible stress shadowing and fracture interference are also investigated. Finally, Stimulated Rock Volume (SRV) is estimated. The pumping parameters are altered and Generation 2

completion recipe is prescribed. Detailed petrophysical work to generate both geomechanical and reservoir properties is conducted. The geomodel enriched with fracture properties is loaded along with constraints of existing production.

Solution

Armed with the history matched geomodel, several forecast scenarios are executed. Comparing the pressure



depletion and net pay maps, several set of infill well locations are selected. The selection criteria included 1 section and 2 sections wells for low, medium and high pressure interference areas, with possible 2, 3 or 4 locations in the sections. The 40 years predicted EUR and production profiles are compared with economics yardstick. In the end, a full potential value of the field with upside included can be obtained.