Title

Reservoir Studies applied to Mature/depleted fields to estimate Remaining Reserves.

Introduction

The objective is to carry out reservoir studies for a mature field, which is now days a reality in the Ecuadorian oil fields. Analysis of main available technical data must be carried out: original oil in place (OOIP), reservoir pressures, and historical production, among others. Main goal is to confirm one of the most important values for oil / gas production: the value of remaining reserves.

In order to determine the value of remaining reserves, the following information must be reviewed and analyzed: seismic/structural maps, reservoir boundaries (stratigraphic section review, fluids contacts definition), petrophysical properties, volumetric factors, drive mechanism, recovery factor, if applicable a material balance must be included, especially if the field has already implemented a mechanism secondary recovery.

It is stronlgy recommended to select a field and a reservoir that have all the data available to estimate reserves. In this case, basing on the historical production data and correlating with all the information. The approach will be performing a Decline Curve Analysis (DCA).

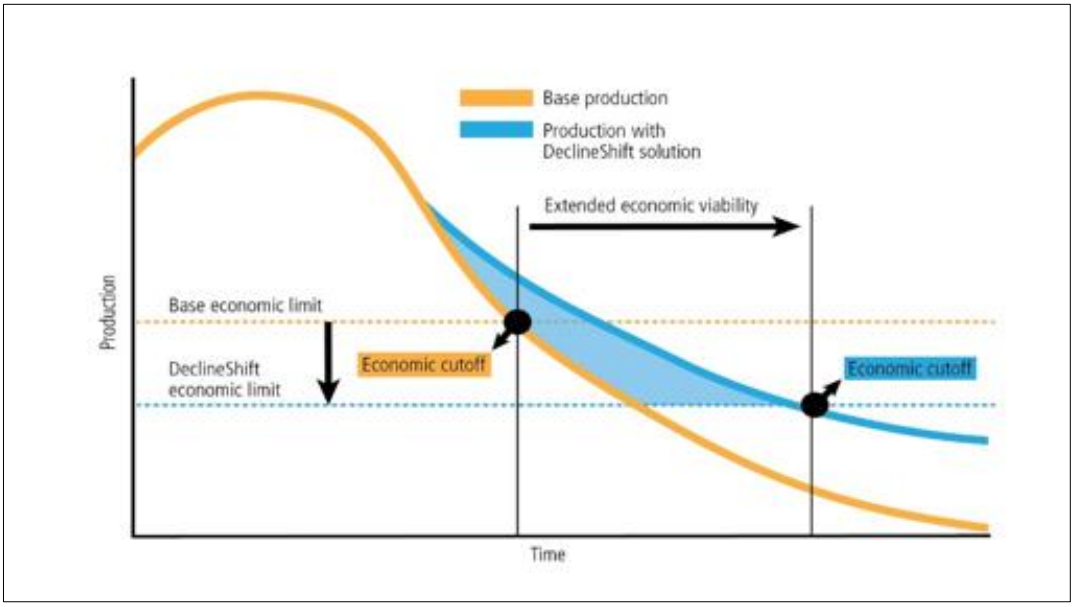

Figure # 1 (Baker Huhes.com)

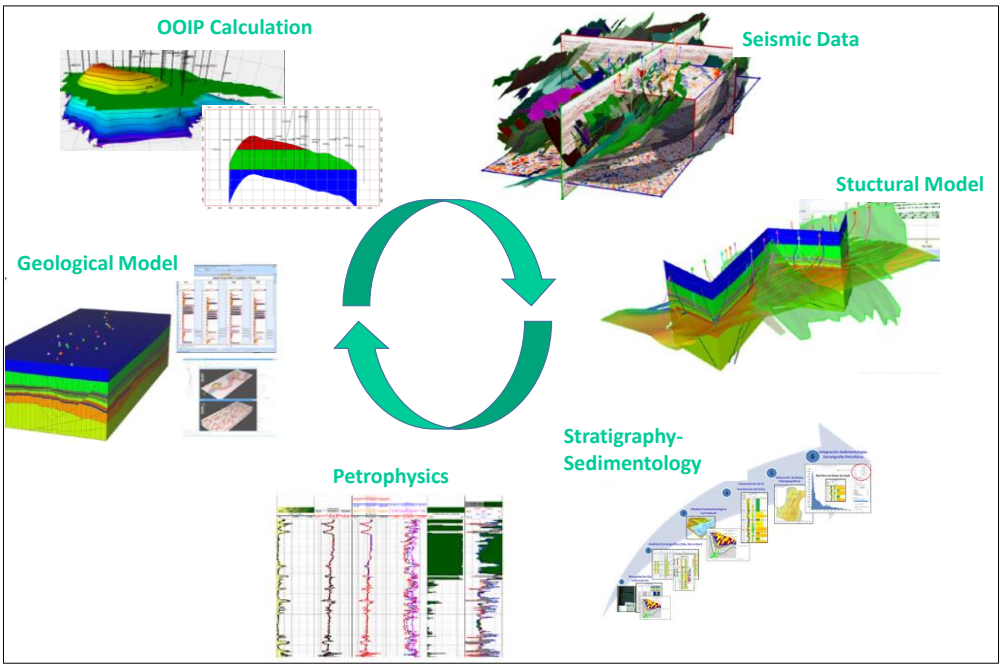

Figure # 2 (RTS Baker Huhes.com)

Goals:

- Review and analyze the following:
  - Structural maps of the reservoir of interest
  - Reservoir boundaries of reservoir (stratigraphic/fluid boundaries)
  - Petrophysical properties of reservoir: Phie, Sw, Vshale, NTG (average for well, compartments and field).
- Determine the next parameters:
  - Volumetric and recovery factor of the reservoir.
  - Best method to calculate the OOIP (deterministic or probabilistic)
  - Production mechanism in the field / reservoir

  In order to perform the DCA analysis:

  - Analyze the production history per well
  - Analyze pressures history of reservoir and important events (implementation of artificial lift, implementation of secondary recovery, etc)
  - If applicable, carry out a of material balance
  - Identify the production mechanism in the field / reservoir.
- Perform DCA curves (Decline Curve Analysis) by well
- Determine the value of Remaining Reserves
- Compare the value obtained by DCA with its adjustment and the Original Oil in Place (reference)

Careers Involved

- Petroleum Engineer
- Geology Engineer
- Production Engineer

Other Aspects

Knowledge in:

- Seismic interpretation to obtain structural maps
- Petrophysics
- Volumetry - calculation of Original Oil in Place
- Pressure Transient Analysis (Build up)
- Decline Curve Analysis
- Material Balance (if applicable)
- Secondary Recovery Mechanisms
- Type of Reserves