

INTERNSHIP IN ADVANCED RESERVOIR SIMULATION OPTIONS FOR NEW ENERGIES

Summary

- **Duration:** 4 to 6 months
- **Location:** 232 Avenue Napoléon Bonaparte, Rueil Malmaison, 92500, France
- **Reference:** RP-2025-01
- **Starting Date:** March-December 2025

Title

Evaluation of reservoir simulators options dedicated to Carbon Storage and Geothermal Energy

Intern profile

Final year student enrolled in a master's degree program with geosciences and reservoir engineer skills. Fast learner and eagerness to understand and master technical software. A good understanding and intuition to represent physical phenomena is needed.

Objectives

As a leading consulting firm in geoscience-related problems, supported by research and development performed at IFPEN Group, Beicip-Franlab is investing more and more resources in creating workflows and solutions to tackle the Energy Transition challenge.

As such, Beicip-Franlab offers an internship dedicated to the technical evaluation of different options from different reservoir simulator tools addressing the technical challenges associated to Carbon Underground Storage (CCUS) and/or energy production from geothermal reservoirs.

In more details, the following dedicated options of several commercial simulators will be investigated and compared to the existing corresponding options in IFPEN simulator PumaFlow

- Fluid models in presence of CO₂
 - Impact of CO₂ content on computed water properties (density, viscosity)
 - Representation of the Joule-Thomson effect when injecting CO₂ in depleted hydrocarbon reservoirs
- Geomechanical models: stress computation and impact of fluid injection (CO₂ for CCUS or water for geothermal) on petrophysical properties on matrix and porous media
- Geochemical models: computation of chemical equilibrium of the water components in space and time, as a consequence of the mixing between injected fluids and reservoir fluids
- Coupling options to integrate thermodynamics / hydrodynamics / geomechanical and geochemical options altogether

The objective of this internship is to provide a panorama of the available options from the mentioned reservoir simulator tools and propose a critical comparison, supported by simulated case studies, of the merits and limitations of these options.

Main tasks undertaken during the internship

- Critical understanding of available 'New energies' options in different commercial reservoir simulators
- Construction and simulation of technical case studies to illustrate the differences (or similarities) between the different simulators
- Redaction of relevant supportive material (report, slides) to document the results, including a marketing-oriented document to promote PumaFlow capabilities for New Energies topics
- Preparation of a tutorial documentation for CCS simulation with PumaFlow
- Participation to other (shorter) reservoir simulation tasks, if any and if deemed relevant

The internship will be supervised by a senior reservoir engineer.

Software used

Reservoir simulators (CMG suite (STARS, GEM, IMEX) / SLB Eclipse / t-Navigator / IFPEN PumaFlow)