

Responsible oil and gas | Enhanced oil recovery (EOR)

ENHANCED OIL RECOVERY (EOR)

OUR STRENGTHS

The EOR Alliance boasts one of the biggest pools of resources and expertise dedicated to EOR, as well as unique laboratories and semi-industrial pilot testing facilities:

- to conduct laboratory and **EOR simulation studies**,
- to **study the impact of chemical EOR on the water cycle**.

OUR LABORATORY TESTING RESOURCES AND SPECIAL EQUIPMENT

Our **laboratory equipment** is used to characterize rocks as well as fluid and gas propagation.

- Laboratory PVT (pressure/volume/temperature), physical chemistry (separation, water treatment) and analysis facilities, as well as special equipment such as scanners and microscanners.

- 18 coreflood test benches, the only such facility in the world, used for flow simulations in reservoir conditions (surfactants, polymers, foam, fractured reservoirs, live oils, etc.).

- One high throughput coreflood experimentation test bench, CAL-X™, patented technology making it possible to reduce the time and costs involved in coreflood testing at the experimental stage, while maintaining the robustness of results.

> *« With the miniaturized coreflood test bench, CAL-X™, it is possible to reduce the size of samples tested by a factor of 4 or 5, as well as the duration of the tests, from a few weeks to a few days. The facility offers greater screening flexibility since it makes it possible to broaden the range of products tested and increase the volume of samples tested. It also offers greater robustness in terms of results, since more parameters can be varied (temperature, salinity, etc.). With CAL-X™ it is possible to visualize fluid displacement in the rock. The detection of behavior that would not be seen in a standard coreflood system (heterogeneity, for example) improves the understanding of mechanisms and their incorporation in the workflow suite. »*
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> ***Souhail Youssef, Technical advisor EOR and SCAL High Throughput Experimentations, IFPEN***

EOR SIMULATION AT VARIOUS SCALES: FROM SAMPLE TO RESERVOIR

PumaFlow™ : Software used for **reservoir simulation**, from laboratory through to field scale.

CougarFlow™ : Software used for **sensitivity analysis and risk assessment**.

SEMI-INDUSTRIAL PILOT TEST FACILITIES

The GOwSP (Gas-Oil-water Separation Platform) platform is a semi-industrial scale closed loop test facility used for:

- testing, in representative conditions, the efficiency of various liquid/liquid and gas/liquid separation technologies,
- carrying out studies on the impact of different chemical additives used for EOR on fluid separation and water management.



« In an EOR context, the aim of tests conducted on the GOwSP platform is to perform semi-industrial scale studies on new technologies and examine the impact of chemical additives on the quality of water/oil separation. These tests are performed in representative conditions following upstream chemical screening on a laboratory scale. It is a validation step aimed at reducing risks associated with field operations. »

Cécile Plais, laboratory manager, and Cyril Cassar, GOwSP test manager, IFPEN

REFERENCES ON EVERY CONTINENT WITH MORE THAN 50 CONTRACTS: OUR SUCCESS STORIES

With more than 30 years' experience each, the three members of the **EOR Alliance** (Beicip-Franlab, IFPEN and Solvay) have contributed to **the world's biggest EOR success stories!**

The **world's 1st chemical EOR reference** (polymers) was built at **Daqing in China** (1980-1990). IFPEN then proposed the 1st polymer injection solution in a heavy oil reservoir in **Canada's Pelican Lake field**. This giant reservoir contains high viscosity oil. In 2005, a pilot project enjoyed considerable success: production from the central producing well rose from fewer than 10 to more than 360 barrels per day. After almost eight years of continuous injection, the pilot facility's central well still produces more than 150 barrels per day with a water/oil ratio below 70%. Following this success, polymer injections were extended to most of the field, making Pelican Lake the 2nd biggest polymer injection operation anywhere in the world behind Daqing.
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R&I PROGRAMS TO CONTINUOUSLY IMPROVE THE EOR ALLIANCE'S OFFER

The EOR Alliance implements **R&I programs to continuously incorporate improvements into its workflows and solutions**.
Recent publications highlight some aspects of this R&I.

> See publications and conference papers

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Our strengths

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