TORP’s Lab Capabilities

TORP’s research facilities are well equipped to handle the challenges of research devoted to improved oil recovery. Occupying 3000 square feet of laboratory space in seven rooms in Learned Hall, the laboratories have been in operation since 1974 and have housed tertiary oil recovery work since that date. Currently, TORP is pursuing the following research areas in these laboratories:

- Carbon Sequestration & Improved Oil Recovery
- Nanotechnology for Oil and Gas Applications
- Flow Assurance
- Chemical Injection for Enhanced Oil Recovery

In a typical composition analysis, the oil composition is determined with a Varian CP-3800 gas chromatograph.

The molecular weight of oil is determined by the freezing point depression (FPD) cryoscopy method with the CRYETTE WR Cryoscope.

Phase behavior studies consist of a swelling/extraction test, high pressure density and viscosity measurement and slim-tube experiment. The swelling test is conducted with an in-house-built high pressure view cell at reservoir temperature (Figure 1).

The swelling factor, solubility of CO$_2$ in crude oil and saturation pressure can be measured. The density and viscosity of crude oil at reservoir temperature can be measured by high pressure densitometer (Anton Paar) and viscometer (Cambridge Instruments). A 40 foot long slim-tube is used for measurement of minimum miscibility pressure (MMP) (Figure 2).

In addition, TORP has commercial geological and reservoir simulation software for reservoir management and simulation. Petra (IHS) and Petrel (Schlumberger) are available for construction of a representative geological model. Reservoir simulation software including Eclipse (Schlumberger), Nexus and VIP (Halliburton), and IMAX, GEM, STAR (CMG), are available for simulation of reservoir performance under a variety of enhanced oil recovery processes.

(clockwise from top left) TOC, Zeta PALS, Coreflood Setup, HPLC/GC, ICP-AES.

Below you will find a summary of some of our current experimental set-ups and analytical equipment as they relate to these projects. Multiple instruments are used to support more than one project.

Carbon Sequestration & Improved Oil Recovery

TORP is well equipped to conduct composition analysis, phase behavior studies and core flow experiments for CO$_2$ flooding and sequestration applications.