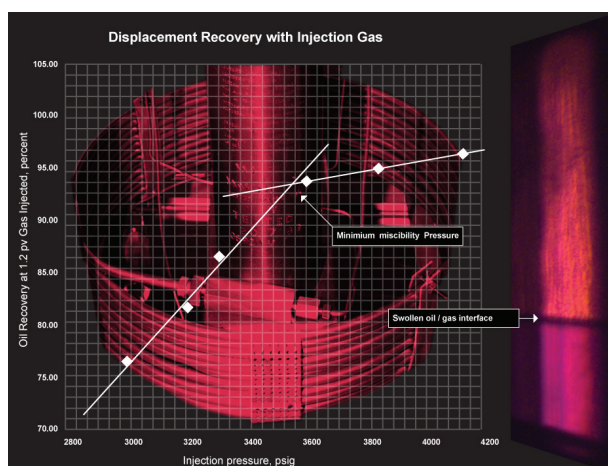


## Enhanced Oil Recovery (EOR)

Prior to launching into an expensive project to recover additional oil from a reservoir, the process can be simulated in the laboratory to establish project viability. Knowledge of the optimum injection pressure and gas compositions will allow the best input into an economic model and/or reservoir simulator. Expro's Fluid Analysis Center has a wide variety of testing suites targeting different methods of enhancing oil recovery.

Expro's enhanced oil recovery analyses utilise state of the art equipment for simulation of these processes. High pressure, windowed PVT cells, gas chromatographs, slim tube apparatus along with other equipment are all used to measure physical and compositional properties to exacting published methods.

All equipment is maintained to the highest tolerances, calibrated against standards traceable to "National Standards", and backed by Expro's ISO 9000:2000 accreditation. Studies are designed with full client consultation, and interim results are provided so that modifications can be incorporated if required.



### Applications:

- Solubility & Swelling Studies
- Packed Column Displacement (Slim Tube) Studies
- Multiple Contact Studies
- Condensate Liquid Revaporization Studies
- Measured Phase Volumes & Compositions below Saturation Pressure for K-Value Determination
- Interfacial Tension Measurements between Gas/Liquid or Liquid/Liquid Phases

### Features:

- Studies can be fully defined at initiation or evolve as interim results are established
- Test process simulated with EOS software prior to initiation of study
- Multiple / Duplicate instruments available
- Integrated with compositional analysis

### Benefits:

- Client maintains complete control over progress of study
- No "surprise" results
- Turn around time reduced
- Provides complete physical and compositional characterisation

## Enhanced Oil Recovery (EOR)

### Technical Specifications:

#### Enhanced Oil Recovery (EOR)

##### Services Provided

##### Preparation of Proposed Injection Gas

Single component hydrocarbon or non-hydrocarbon, or mixture of both  
Pure components available through C10  
Synthetic gases can be enriched with NGL's  
Full PVT and compositional analysis (to C36+) of prepared fluid

##### Solubility / Swelling Studies

Equation of state (EOS) simulation with tuned or untuned data  
Gas additions to targeted gas / liquid concentrations  
Gas additions to targeted saturation pressures  
Constant mass expansion data to desired level of expansion  
Expansion to saturation pressure  
Expansion below saturation pressure  
Percent liquid level measurements below saturation pressure

##### Miscibility Studies

Equation-of-state simulation with tuned or untuned data  
Choice of injection gases (see gas preparation above)  
Displacement at specified pressures and temperatures  
Determination of minimum miscibility pressure (MMP)  
Determination of minimum injection gas enrichment to achieve miscibility (MME)  
Collection & analysis of displacement effluents  
Gas analysis to last detectable component (<C15)  
Liquid analysis to C36+  
Dynamic measurement of effluent density at T & P

##### Multiple Contact Studies

Simulating gas injection into an oil reservoir for gas enrichment and recovery of intermediate oil components  
Gas injection & production can be performed on either a constant volume or differential basis  
Detail options available as per Solubility / Swelling Studies (see above)

##### Condensate Revapourisation Studies

Simulating gas injection into a gas reservoir for gas enrichment and recovery of intermediate liquid components from condensed retrograde liquids  
Gas injection & production can be performed on either a constant volume or differential basis  
Detail options available as per Solubility / Swelling Studies (see above)

##### Equilibrium Products (K-Values) Studies

Equilibration and evaluation of gas & liquid phases at specified P & T conditions for EOS tuning  
Gas and liquid physical properties determined; volume, density, viscosity, gas Z-factor  
Gas and liquid composition determined to C36+  
Interfacial tension measurement