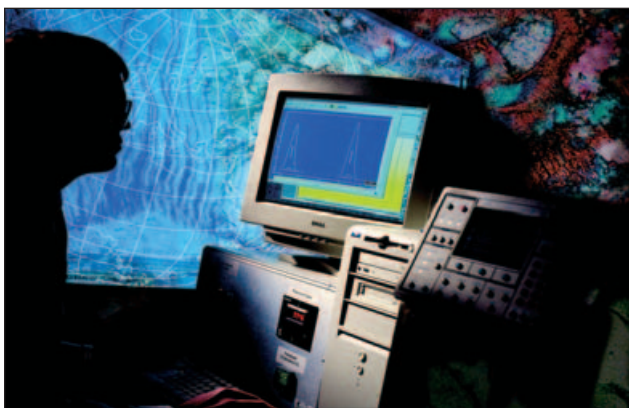


# The Petroleum Services Division



Petroleum Services, a Core Laboratories Reservoir Description Division, is the world's most technologically advanced and largest independent provider of petrophysical and reservoir fluid services to describe the reservoir system. The company provides the majority of its services through three groups:

- Wellsite Services
- Rock Properties (Routine and Advanced)
- Reservoir Fluids



## Wellsite Services

Core Lab Petroleum Services offers a comprehensive array of wellsite services for both on-site core handling and reservoir fluids analysis to bring you early-time reservoir characterization data right from the rig.

**Rocks** – Our unique wellsite core characterization and core processing techniques include core catching, plugging, core stabilization by full-barrel resin injection, and sample preservation. Our specially trained core analysts have experience in many different locations, climates, and difficult operating conditions. Their experience qualifies our technicians to identify and solve problems which could impact core quality and subsequent laboratory measurements.

**Fluids** – We offer subsurface and surface hydrocarbon fluid sampling using single-phase subsurface and positive-displacement sampling chambers and cylinders. Samples can be taken at pressures to 25,000 psi and temperatures to 350°F. We collect and transfer samples from the wellbore, wellhead, test separator, or any other

process point; and we offer on-site sample validation and transfer of openhole tools such as the Schlumberger MDT\* Modular Formation Dynamic Tester or the Baker Atlas RCI<sup>SM</sup> Reservoir Characterization Instrument.

Mobile fluids laboratories are available for well-site restoration, sample validation, PVT and compositional analysis, oil and water analysis, and the evaluation of oil-based mud filtrate contamination.

When required, certain trace components can be determined on site or sampled into prepared, chemically treated receptacles for immediate analysis onshore.

**Equipment** – Core Lab Petroleum Services also supplies a wide variety of oilfield analysis equipment on a short- or long-term hire basis. The available items include gas chromatographs; Coulter Counters; Karl Fisher, Miran, and Hach spectrophotometers; and centrifuge equipment. On-site training and test procedures are also available.

## Rock Properties

The Rock Properties Group performs an exhaustive range of routine and advanced rock properties analyses needed to resolve complex reservoir evaluations.

**Routine Rock Properties** – Whole cores, plugs, and sidewall cores are routinely analyzed for porosity, permeability, fluid saturations, description of probable production, sample quality index, and lithological description. Digital photography, both white and ultraviolet light source, and laser particle size analysis are often added for a more complete evaluation. All data presentations are available in digital format via Core's secure Internet Data Management services.

**Advanced Rock Properties** – We provide reservoir-condition petrophysical measurements such as capillary pressure, electrical properties (formation resistivity factor and index), pore volume compressibility, NMR measurements, and wettability, as well as steady- and unsteady-state relative permeability.

For geomechanics testing, we have a comprehensive facility providing uniaxial and triaxial stress testing for static and dynamic moduli.

Using the same stress conditions, we can also determine acoustic velocity at seismic, log, and ultrasonic frequencies for shear and compressional waves for log calibration and seismic analysis.

Formation damage analysis provides detailed solutions to wellbore and production impairment problems and supports investigation of stimulation and treatment effects.

**Geological Services** – Geological Services personnel conduct sedimentological, petrographic, and mineralogic studies. Facies interpretations and sequence stratigraphy are employed to delineate reservoir architecture. Our geologists are uniquely qualified to relate geologic observations to petrophysical properties and log responses. Fracture studies and the evaluation of drill cuttings are conducted using proprietary methods.

**Geochemistry** – Oil- and gas-prone source rock is identified and an assessment is made of original hydrocarbon potential for mature source rocks. The number of genetically distinct oil families (sources) existing in an area is determined, as well as probable migration pathways, thermal maturity and type/degree of alteration.

Services offered include source rock evaluation; gas, condensate, crude oil, and oil seep characterization; and reservoir geochemistry analyses.

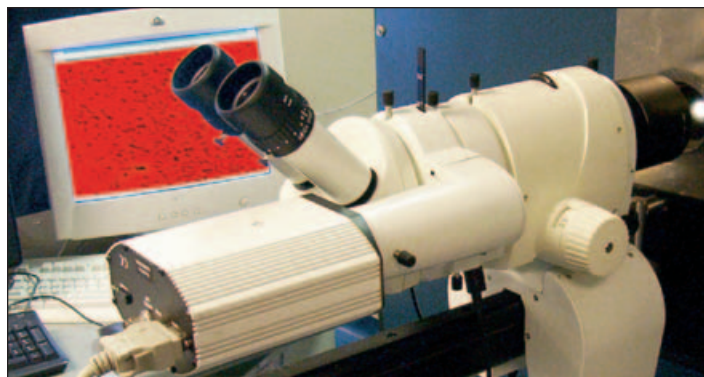
**Biostratigraphy** – Our biostratigraphic services include stratigraphic reviews, correlation studies, and multi-disciplinary integrated studies. We are involved in high-resolution biostratigraphy and palynofacies/biofacies studies – fully integrated with seismic, wireline log, and sedimentological or lithofacies data – for improved sequence stratigraphic interpretation.

For quick evaluation of age and depositional environment of the formations drilled and for biosteering in horizontal wells, micropaleontological and palynological analyses can be performed at the wellsite.

### Reservoir Fluids

The Reservoir Fluids group provides a wide range of reservoir fluid analysis and consulting services.

Highly trained specialists are on staff to provide bottomhole sample acquisition, high-pressure transfers from formation test tools, and collection of separator oil and gas samples. A *Next Generation* mobile laboratory offers best-in-class transfer and analytical capabilities for offshore sample acquisition and evaluation.



Comprehensive phase behavior analyses yield fluid characteristics of black oils, volatile oils, and gas condensates. Enhanced and improved oil recovery (EOR/IOR) studies address multi-contact and miscibility concerns. A capillary flow system is used to study the behavior of live or stock-tank oils in pipeline and production facilities.

The Pressurized Fluids Imaging (PFI™) system is used to determine the onset of asphaltene and other solids in reservoir fluids under reservoir and production conditions. Onset studies of reservoir fluids in contact with gases or inhibitors are used to evaluate production and treatment processes.

A full range of sophisticated water analyses are available, along with oilfield chemistry and ASTM tests to evaluate crude oil properties.

Sample management and storage facilities provide state-of-the-art protection of pressurized reservoir fluids, stock-tank oils, and water samples placed into long-term storage.

### For Optimized Value

By combining all aspects of reservoir characterization, the Petroleum Services Division can provide critical input for reservoir simulation models that are central to the appraisal and development of any hydrocarbon accumulation.

The Petroleum Services Division provides its services through six Advanced Technology Centers linked to a network of 20 regional specialty facilities worldwide.

### For More Information

For a complete overview of our products and services, visit our website at [www.corelab.com](http://www.corelab.com)



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