

BETTER DECISIONS THROUGH THE RIGHT COMBINATION OF CAPABILITIES.

For conventional hydrocarbon reservoirs, **Weatherford Laboratories** offers more capabilities under one roof than any other technical service option, focusing on customized solutions. These two benefits help you make faster, better informed decisions about new opportunities, or enable you to maximize recovery from depleted reservoirs.

And even though conventional reservoir risks are “lower” than those in cutting-edge plays, you need accurate petrophysical and geochemical interpretations to measure hydrocarbon content, assess reservoir potential, and avoid possible problems.

Reservoir analyses at **Weatherford Laboratories** are matched to your needs, from wellsite services to laboratory testing. Our adaptive approach applies to all sample types - conventional core, percussion sidewall core, rotary sidewall core and cuttings. No matter what your requirements, **Weatherford Laboratories** delivers analytical results to match your unique specifications which allows you to make more educated decisions in a timely fashion.

INNOVATIONS

Papers/Studies

- Hundreds of papers presented at conferences, seminars and published in scholarly journals covering a broad spectrum of topics related to conventional hydrocarbon reservoirs
- Multiple studies in both deep-water and onshore in the areas of petrology, conventional core, special core, formation damage, fluid phase behavior, enhanced gas and oil recovery, and geochemistry



Technologies

- Core analysis results provided online via secure personal client websites
- CoreTrac™ – customized software developed for improved project management and laboratory efficiency
- One of first companies to provide Touchstone-compatible thin section composition point count, grain size, and grain coating analysis

COMPREHENSIVE SERVICES. COMPLETE RESERVOIR CHARACTERIZATION.

Wellsite Stabilization & Transport

→ Preserves crucial cores for precise laboratory analysis

Routine Core Analysis

→ Conclusive indicator of hydrocarbons. Direct measurement of reservoir quality. Core data improves geological/engineering models

Core Photography

→ High resolution digital or printed images in visible and UV light

Geochemistry

→ Assess thermal maturity. Confirms organic content. Measures gas prospectivity

Petrographic Analysis

→ Accurate descriptor of reservoir quality, mineralogy, compaction and cementation. Assessment of anomalous log response. Predicts fluid sensitivity issues

Rock Mechanics

→ Data for calibration of acoustic velocity logs. Accurate assessment of porosity loss by formation compressibility. Determine rock strength for well bore stability and fracture potential

Special Core Analysis

→ Engineering and petrophysical data that assesses your well performance from drilling through to exploitation. Optimizes production potential and reserves

INNOVATIONS

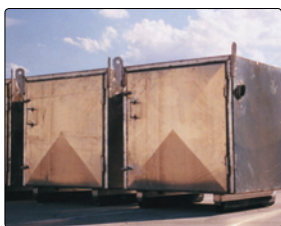
Processes

- Field gas and liquids collection including multi rate separator sampling for rich gas condensates and volatile oils
- Critical condensate saturation, gas/condensate relative permeability and HPHT gas/liquid IFT

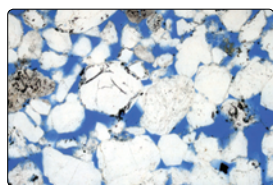


- Vapor desorption capillary pressure in tight gas sands
- Epifluorescence analysis (proprietary SOP for Thin Section preparation) for evaluating microporosity and micro-fractures
- Wellsite and laboratory tools for handling poorly consolidated samples
- Calculated permeability from Thin Sections, for perm estimation using percussion cores, cuttings and other “difficult” sample types

INNOVATIONS



Weatherford Laboratories provides comprehensive services that support all of your oil & gas plays, in both conventional and unconventional reservoirs.



Processes

- Electromagnetic separation for cutting analysis as a commercial service
- Capillary pressure and resistivity measurements at full reservoir conditions using live fluids by porous plate
- Integrated thin section petrography to evaluate proppant imbedment



Equipment

- CT software for 3D reconstructions and quantitative analysis
- Rapid XRD scanning using Lynxeye High Speed Detector
- D-4 automated X-ray diffractometer analysis – 66 samples per run

COMPREHENSIVE CORE & FLUIDS LABORATORY TESTS

FIELD SAMPLING OF CORE AND FLUIDS

Core Stabilization and Preservation
Mobile Field Laboratory Services
In Line and Separator Liquid and Gas Collection
Multi-rate Gas Condensate Sampling

CONVENTIONAL AND SIDEWALL CORE ANALYSIS

Permeability, Porosity, Fluid Saturations, Grain Density
Probe Permeability
Fast Track Cleaning – Pressure Extraction
Laser Grain Size Analysis of Unconsolidated Sand
Photography

GEOLOGY

Thin Section Preparation
Thin Section Description, Grain Size Analysis, and Calculated Permeability
CT Scanning and Evaluation
Scanning Electron Microscopy (SEM)
X-Ray Diffraction (XRD)
Detailed Core & Fracture Descriptions
Biostratigraphy

GEOCHEMISTRY

Organic Petrology (Ro, TOC, TAI, Visual Kerogen Analysis)
Residual Oil Fingerprint
Collection and Analysis of Cuttings

GAS CONTENT ANALYSIS

Total Gas Content Analysis

Gas Isotope Analysis
Adsorbed Gas Storage Capacity
Free Gas Storage Capacity

SHALE ROCK PROPERTIES (SRP)

As-received Mercury Bulk Volume Determination
Crushed Preparation
Fluid and Gas Saturation % PV
As-received and Dry Gas Filled Porosity % Bv
As-received and Dry Grain Density
As-received and Dry Bulk Density
As-received Pressure Decay
Permeability

ADVANCED CORE AND FLUIDS ANALYSIS

Mercury Injection, Centrifuge, and Air/Oil Brine Wettability Capillary Pressure Tests
Relative Permeability
Formation Damage Testing
Electrical Properties Testing
Water/Chemical Flooding
Nuclear Magnetic Resonance (NMR)
Calibration Testing
Water Analysis
Phase Behavior Tests
Enhanced Gas/Oil Recovery

ROCK MECHANICS

Young's Modulus and Poisson's Ratio
Triaxial Compressive Strength Test
Acoustic (Ultrasonic) Velocity Test
Pore Volume Compressibility
Proppant Embedment

EXPECT MORE FROM WEATHERFORD LABORATORIES.

At **Weatherford Laboratories**, we hold fast to Higher Standards. Our purpose is to continually push past conventional solutions to find new and better ways to optimize oil and gas production.

With 38 laboratories around the globe, our team raises the bar for wellsite sampling, core management services, geochemical analyses, and evaluation of traditional and unconventional reservoirs.

At Weatherford Laboratories, we expect more from ourselves so you can expect more from us.

38

LABORATORY LOCATIONS

18

COUNTRIES

1

WORLDWIDE RESOURCE

38 LABORATORY LOCATIONS IN 18 COUNTRIES

NORTH AMERICA

Canada
United States

EUROPE

Norway
United Kingdom

LATIN AMERICA

Brazil
Mexico
Trinidad
Venezuela

MIDDLE EAST / NORTH AFRICA

Kuwait
Libya
Oman
Saudi Arabia
United Arab Emirates

ASIA PACIFIC

Australia
India
Malaysia
Thailand
New Zealand

For contact information, please visit our website:
www.weatherfordlabs.com