



LEADING THE WORLD IN UNCONSOLIDATED CORE PRESERVATION.

The definition of “deepwater” has changed dramatically over the last 20 years. In the late ‘80s, 1000-foot steel platforms were state-of-the-art. Today, drill ships float in 10,000 feet of water and drive drill bits below 34,000 feet. Throughout, however, the deepwater has always demanded cutting edge technology to mitigate extreme risk.

At **Weatherford Laboratories**, we introduced revolutionary wellsite equipment, which gave us a unique view to deepwater exploration and appraisal programs in the Gulf of Mexico. We stabilized record core runs in 1999 and again in 2007; we stabilized the record depth core in 2006; and we have stabilized, sampled, preserved and transported over 18,000 feet of core since 2000.

In the laboratory, **Weatherford Laboratories** has been equally innovative. We developed comprehensive analytical techniques that guide sand control strategies, enhance log interpretation, and make direct petrophysical measurements which drive the reservoir model. As a result, you can more accurately appraise reservoir quality, define field size and reserves, and manage the risk inherent in deepwater exploration.

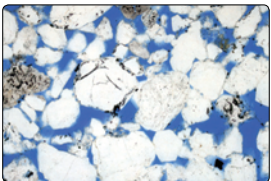
HISTORY

Wellsite Record

Stabilized record core runs:
1999 and 2007

Stabilized record core depth:
2006

In excess of 18,000 feet
stabilized and transported
in the Gulf of Mexico alone:
2000-2008



Studies

- Proprietary 10-year ongoing Reservoir Quality Prediction Modeling (Touchstone Compatible)
- Deep Petroleum Systems of the Northern Gulf of Mexico: An Integrated Geochemical Study
- Proprietary Gulf-Wide Paleogene Sedimentological Comparative Study

COMPREHENSIVE DEEPWATER EXPERTISE, FROM WELLSITE TO ADVANCED ROCK ANALYSES.

Wellsite Core Stabilization & Sample Preservation

→ Optimizes utility of the core for analysis in the laboratory

Detailed Petrographic Examination

→ Characterizes cementation and compaction

Precise Measurement of Electrical Properties, Relative Permeability, Capillary Pressure

→ Constrains reservoir simulation models

Formation Damage Studies

→ Refines sand control strategies including screen design and gravel packs

Gas Isotope Analysis

→ Compartmentalizes reservoir by geochemistry

Sedimentological Description

→ Interprets depositional environment for understanding of reservoir geometries

Whole Oil Gas Chromatography

→ Evaluates reservoir continuity and oil quality

SARA Analysis

→ Assesses flow assurance

GCMS & GCMSMS

→ Correlates oil to source rock, establishes oil maturity, depositional environment, and can provide age diagnostic bio-marker assessment

Thermal Extract GC

→ Identifies by-passed pay zones

INNOVATIONS

Processes

- Pioneered pilot study programs that target appropriate cleaning and drying methods to specific reservoirs
- Proprietary methodology for removing synthetic based muds from contaminated cuttings and dead oil samples



Technologies

- Pioneered the use of computed tomography to orient cores for slabbing and sampling
- Invented mercury injection at net confining stress

Equipment

- Wellsite and laboratory tools for poorly consolidated samples
- Source rock analyzer (SRA) for improved pyrolysis information

TURNKEY SERVICES SUPPORT YOUR DEEPWATER PLAYS.



WELLSITE

- Wellsite Personnel for Core Stabilization, Packaging & Transport
- Aluminum 4x4x4 Core Transport Containers
- Portable Wellsite Gamma
- Wellsite Plug Drilling for Saturation Studies

CORE PROCESSING

- Specialized Slabbing Techniques to Optimize Photography and Sedimentological Studies
- Specialized Plugging Techniques to Preserve As-Received Saturations
- Proprietary Procedures to Minimize Evaporation



PHOTOGRAPHY

- High Resolution Core Photography in Multiple Formats

CORE STORAGE & VIEWING

- Core Storage Facilities at 5 Temperatures Ranging from Ambient to Dry Ice
- State-of-the-Art Core Viewing Rooms



PROJECT MANAGEMENT

- Secured Client Websites for Data Retrieval & Archival
- CoreTrac™: Internal Management Information System for Project Tracking, Accessible Worldwide

DEEPWATER LABORATORY TESTS

PRELIMINARY PETROPHYSICS

- Sample Cleaning and Drying Assessment
- Porosity and Permeability Studies
- Dean Stark Saturations

GEOLOGY

- CT Scanning and Evaluation
- Scanning Electron Microscopy (SEM)
- X-Ray Diffraction (XRD)
- Bulk & Clay Mineralogy
- Detailed Core & Fracture Descriptions
- Thin Section Preparation
- Thin Section Analysis
- EPI Fluorescence Microscopy

GEOCHEMISTRY

- Petroleum Bulk Properties
- High Resolution Gas Chromatography and Mass Spectrometry
- Gas Composition/Head Space Analysis
- Gas Isotope Analysis
- SARA Analysis

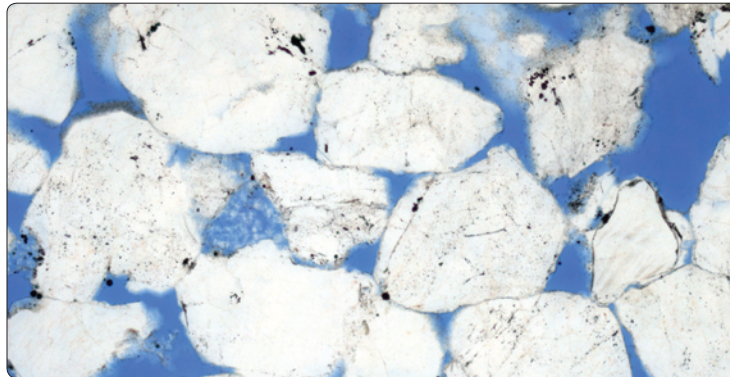
- TOC and Pyrolysis Diamondoids
- Alkyl Benzene Analysis

ADVANCED CORE ANALYSIS

- Reservoir Conditions Relative Permeability
- Electrical Properties
- Porous Plate Capillary Pressure
- Centrifuge at Net Confining Stress
- Sand Control Testing
- Formation Damage Studies
- Produced Solids Evaluation

ROCK MECHANICS

- Unconfined and Triaxial Compressive Strength Tests
- Static Young's Modulus and Poisson's Ratio
- Mohr-Coulomb Failure Analysis
- Acoustic (Ultrasonic) Velocity Test
- Compressional (P) and Shear (S) Wave Velocities (1MHz)
- Dynamic Elastic Parameters



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