

WEATHERFORD LABORATORIES OPTIMIZES IN SITU EXTRACTION METHODS.

Whether you produce by cold processes or thermal in situ production, or your reservoirs are either heavy oil carbonates or bitumen-rich sands, **Weatherford Laboratories** offers the widest range of evaluation testing in the industry. Steam assisted gravity drainage to cyclic steam stimulation or advancing technology like low and high temperature vapor extraction, the Higher Standards of Weatherford Laboratories offer you an unmatched advantage. You get outstanding evaluations, from relative permeability at elevated temperatures to crucial sand control and aquathermolysis testing.

Weatherford Laboratories' experience and standards also deliver data that is directly importable into numerical simulations. So when your engineers are building models of what your reservoir looks like, and how it will perform, you have the data that better simulates reality.

But our studies take you beyond simulation, to a higher level of integration with field process. So you can avoid production problems and optimize recovery, reducing risk and expense worldwide.

HISTORY

Papers

Over 50 technical publications in the area of Heavy Production and Optimization including:

- "Predicting Foamy Oil Recovery", SPE 2001
- "Protocols for Slotted Liner Design for Optimum SAGD Operation", Petroleum Society of the CIM 2008
- "Laboratory Procedures for Optimizing the Recovery from High Temperature" CIM 2005
- "Thermal Heavy Oil and Bitumen Recovery Operations", Petroleum Society of the CIM 2007



Studies

- Numerous heavy oil studies have been conducted on core and fluids from many local and international locations including: Canada, Venezuela, Oman, Turkey, Indonesia, United States, Mexico, Albania, Egypt and Brazil

LEADERS IN TECHNOLOGY ADVANCES TO OPTIMIZE PRODUCTION OF HEAVY OIL.

Thermal Heavy Oil and Bitumen Recovery Studies

- Identifies the best reservoir process (Cyclic Steam Stimulation, Steam Assisted Gravity Drainage, Steam Drive) for exploiting heavy oil and bitumen reservoirs by thermal means

PVT & Fluid Phase Behavior

- Measures transport and phase behavior at low and high temperature and pressure

Slotted Liner and Screen Design for Sand Control

- Improves the performance of thermal wells completed using slotted liner or wire wrapped screen technology

Formation Damage Evaluation for Drilling and Completion of Heavy Oil Reservoir

- Optimizes drilling and completions program

Aquathermolysis Testing

- Investigates CO₂ and H₂S generation levels at HPHT steamflood conditions

High Temperature Caprock Integrity Studies

- Determines if the integrity of the primary shale formations overlying the steam assisted gravity drainage (SAGD) steam chamber are able to maintain a competent seal that will confine the SAGD operation to the producing formation

Vapex, Hot and Cold Solvent Testing

- Evaluates effectiveness of Vapex & low and high temperature solvents

HISTORY

Heavy Oil Projects

- CANADA: McMurray, Grand Rapids, Dina, Clearwater, General Petroleum Sand, Wabiskaw, Sparky
- ALBANIA: Driza



Honors / Affiliations

- Dr. Brent Thomas
Winner of 3 best published technical papers with JCPT; Distinguished author for CIM; Distinguished lecturer for SPE
- Dr. Brant Bennion
Winner of 3 best published technical papers with JCPT; Distinguished author for CIM; Distinguished lecturer for CIM; Distinguished lecturer for SPE

TURNKEY SERVICES SUPPORT YOUR HEAVY OIL & BITUMEN-RICH SANDS 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

HEAVY OIL & BITUMEN-RICH SANDS

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

ROUTINE ANALYSIS

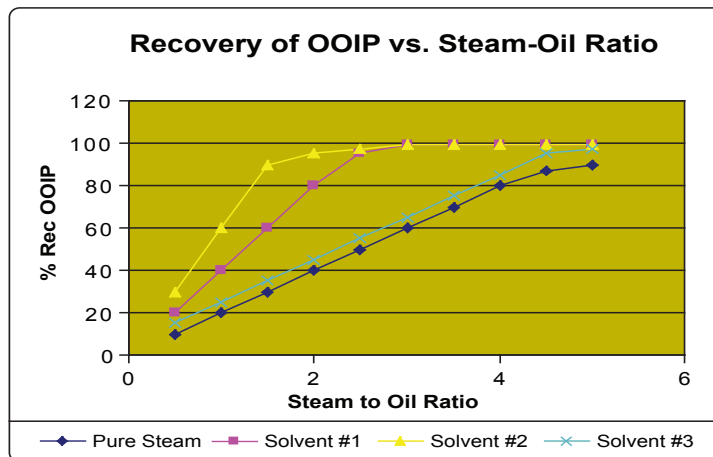
- Field Recovery, Handling and Preservation
- CT Scanning and Evaluation
- Gama Log
- Slabbing
- Permeability and Porosity
- Saturations by Dean Stark Analysis
- Sieve Analysis
- Storage and Handling

FLUID PHASE BEHAVIOR

- Reservoir Fluid and Gas Characterization
- Differential Liberation, PVT
- Foamy Oil Studies
- Bitumen Extraction From Core
- Commutation for Water Analysis
- Diluent Diffusion Studies
- Solids Characterization

ADVANCED CORE ANALYSIS

- Steam Flood and Relative Permeability Testing
- Drilling Fluid Optimization for Reduced Formation Damage
- Completion Fluid Optimization for Reduced Formation Damage
- Sand Control Design
- Aquathermolysis Testing for H₂S and CO₂
- Cap Rock Evaluation



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