UAF’s Petroleum Development Lab

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Auto Flood Reservoir Conditions Core-Flooding System

The AFS-300 is an advanced, modular, computer controlled core-flooding system configured for liquid permeability, water flood, water flood susceptibility, chemical and solvent flood, gas flooding, and unsteady state liquid/liquid and liquid/gas relative permeability tests.
Pressure Volume Temperature System

Used for standard hydrocarbon high pressure and high temperature phase transition studies.
Gas Chromatograph

Allows for component analysis.
Malven Rheometer

Measure rheology properties from -10 C to 250 C, and up to 600 psi.
Foam generator and stability tester

Generates foams from CO2, nitrogen, natural gas, air and several other media to test their stability under various conditions, room temperature to 100 C, and 14.7 psi to 1500 psi.

Select appropriate foam for core flooding.
Gas hydrate flow through experiment

For the study of hydrate phase behavior.
Gas hydrate relative permeability experiment

Form hydrates and maintain their thermodynamic stability during permeability experiments using numerous fluids.
Formation Damage Evaluation and Simulation System

Using reservoir rock samples, the system measures the permeability and effectiveness of various drilling and completion fluids at reservoir pressure and temperature. Core samples are placed in a Viton sleeve with end-plugs designed to facilitate the introduction of completion acid mixes and to allow insertion of ring spacers for accumulation of filter cake at the upstream end of the sample. Simulated overburden pressure is applied. Our data acquisition system measures flow rates, pressures, temperatures, and cumulative flow volumes. Normal operating conditions for the system are 5,000 psig confining pressure, 3000 psig pore pressure and 300 °F temperature.
Slim tube

A slim tube allows for estimates to be made regarding the minimum miscibility pressure (MMP) or minimum miscibility concentration (MMC) of a given injection solvent and reservoir oil.
Cold Heavy Oil Production with Sand (CHOPS) will be a key to unlock the next big development target on the North Slope. The Petroleum Development Lab can design and fabricate experimental apparatus for special studies.
Nanoparticle dispersion equipment

Used to prepare nanoparticle dispersions for measuring effectiveness for EOR and drilling mud properties improvement.

Nanoparticles cannot be introduced into the mud directly. High energy is required to disperse them evenly in water, and subsequently into the clay.
Walter Herzog Hda-627
Automatic Atmospheric Distillation Apparatus

Useful for laboratory distillations of petroleum products and component analysis.
Capillary pressure measurement

Used to derive capillary pressure curve for a given core sample.
Relative permeability measurement

Relative permeability and capillary pressure relationships are important for estimating the amount of oil and gas in a reservoir and for predicting the capacity for flow of oil, water, and gas throughout the life of the reservoir.
Porosity Measurements

The determination of porosity is paramount because it determines the ultimate volume of a rock type that contains hydrocarbons.
Dynamic Linear Swell Meter with Compactor and Computer

Drilling fluid constantly circulates around the sample.

Measures up to four drilling fluids (expandable to eight) simultaneously.

Manufactured from 316 Stainless Steel.

Electronic Data Collection – the Linear Variable Differential Transformers measures expansion of sample.

Includes dies and hydraulic press for making shale sample wafers if needed.

Provides realistic results since fluid is in contact with the wafer from all sides.
Model 900 Viscometer

Push button calibration history and graphs available for improved analysis (with ORCADA® software)

Single button operations on the keypad

Has the ability to operate accurately at extremely low shear rates (0.01 RPM)
Permeability Plugging Tester

The instrument is used for conducting filtration tests on plugging materials without the interference of particles settling on the filter medium.
High-Pressure
High-Temperature
Filter Press

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Lubricity Tester

Measures lubricity quality of drilling fluids, provide data to evaluate the type and quantity of lubricating additives that may be required, and predict wear rates of mechanical parts.
Cement Permeameter

Used to test permeability of cement cores. Originally acquired for supporting development of a light weight, high-insulating, casing concrete.
Atmospheric Cement Consistometer

Used for conditioning cement slurries as specified within API Specification 10. Determination of rheological properties, examination of free water content, and valuation of the API fluid loss test all require that the cement slurry be pre-conditioned by an atmospheric consistometer.
Automated High-Temperature High-Pressure Cement Consistometer

Automated HTHP is used to determine the thickening time of oil well cements under simulated down-hole pressures and temperatures.