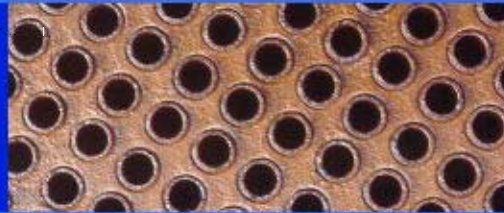




ESDU SPE-M3-1

Stirred vessel fouling tests

Unamended
Issued 01 June 2007



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CRUDE OIL FOULING PROJECT SUB-PROJECT E: STIRRED VESSEL FOULING TESTS

Prof Barry Crittenden

Dr Olivier Camus (Post-doc)

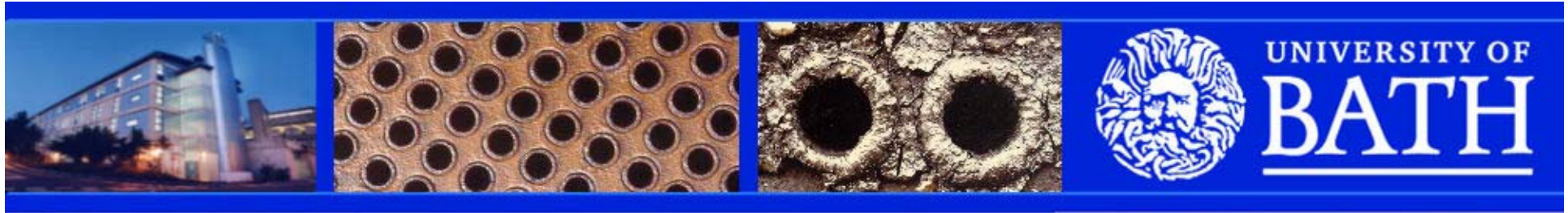
Mr Andrew Young (PhD Student)

**Progress Meeting @ Imperial College
28th March 2007**



*From - ChE & BioE Departments, University of
Illinois at Chicago*





SUB-PROJECT E OBJECTIVES

1. Design & construct stirred cell to Eaton & Lux design (c.30 bar & c. 300 °C surface temperature);
2. Obtain representative data over wide range of conditions for comparison with theoretical models developed under Sub-Project C & for input to Sub-Projects involved in chemistry & thermodynamics;
3. Modelling fouling processes under controlled & known conditions of shear stress and temperature (surface & bulk) for further development in Sub-Projects G & H;
4. Provide representative samples of deposits for the Sub-Projects involved in chemistry & thermodynamics.



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EATON & LUX EXPERIMENTS (1984)

Fast

Effect of crude oils & mixtures

Effect of surface temperature

Effect of asphaltene solubility

Effect of dissolved air

Effect of inorganic acids

Effect of metal chlorides

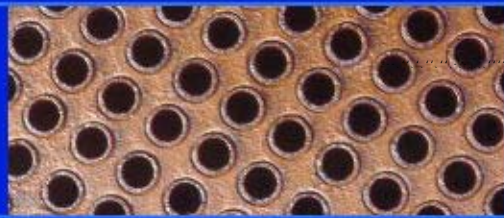
Effect of depletion of fouling precursors

Effect of anti-foulant chemicals

**But effects of
turbulence or shear
modifiers were not
studied**



**Effects of mechanical devices
cannot be studied directly**



Design Based on Eaton & Lux Test Cell

1 litre inventory

Rotating cylinder or turbine

Magnetic drive

Heat flux & temperature control

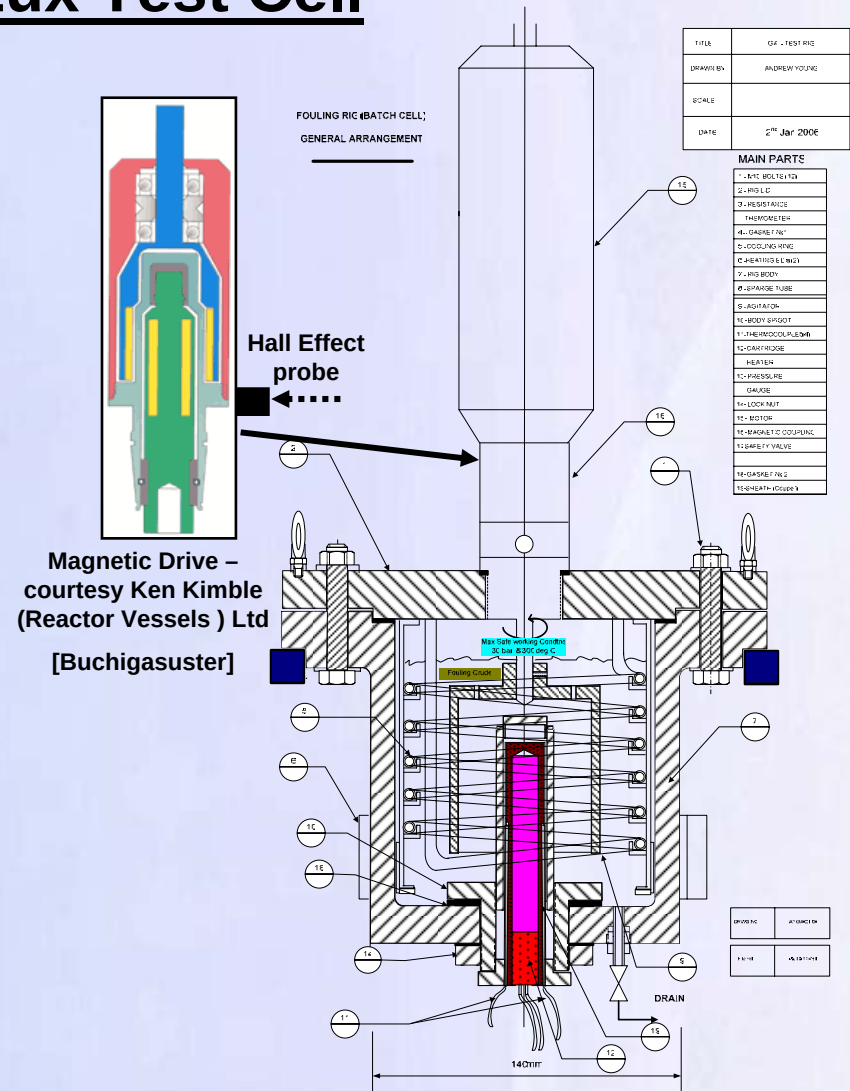
Speed/turbulence control

Pressure control

Crudes, mixtures, modifiers

**Samples/heated surface
removable/changeable**

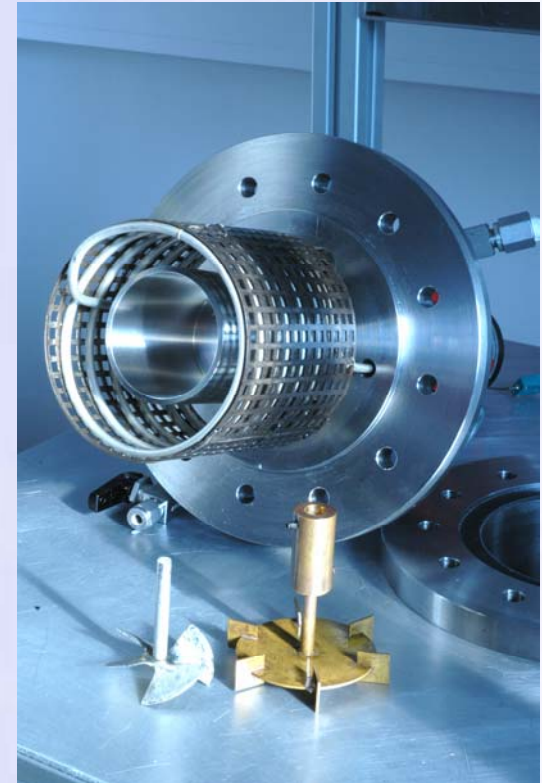
Standard design & safety systems





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Rig Development





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Magnetic Drive Calibration - 1

Average actual speed/ stated speed as a function of Reynolds number for different viscosity fluids
(RUSHTON TURBINE)

