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Center for Multiphase Flow Research and Education

Why do wells leak, how much do they leak and will multiphase fluid dynamics save the day?

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Wednesday, August 28, 10 am, 2004 Black Engineering

Abstract

Since the early 2000's much of North America has seen an massive growth in so-called unconventional gas production, made possible via advances in horizontal drilling and hydraulic fracturing techniques. With the economic advantages come various problems associated with sustainable environmental management of the industry. Part of this is the fact that a fraction of wells leak. Here we will present data on the main processes associated with establishing well integrity, expose the difficulties of the primary cementing operation and hence explain why leakage occurs. Finally we will present both highlights from ongoing research and open questions of relevance to well integrity that need multi-phase fluid dynamics in order to solve them.

Biography

Ian Frigaard is Professor of Mechanical Engineering and Applied Mathematics at the University of British Columbia. He holds B.Sc. From Cardiff University, M.Sc. and D.Phil. degrees from Oxford University. He joined UBC in 2000 after 3 years with Alcan International, a postdoc period at the University of Linz and 6 years with Schlumberger. His research work has two main foci: the fluid mechanics of yield stress fluids and the modelling of non-Newtonian fluid flows stemming from the oil & gas industry. His interests span experimental, computational and analytical methods. Problems of classical nature (bubbles, particles, hydrodynamic stability,...) and very applied problems (cementing of oil & gas wells, pipelining, etc) have equal interest. He is Editor-in-Chief of the Journal of Non-Newtonian Fluid Mechanics and serves on the Editorial boards of Rheologica Acta, Meccanica and Journal of Engineering Mathematics.



This seminar counts towards the ME 600 seminar requirement for Mechanical Engineering graduate students.

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