

Multiphase Pump Tutorial Agenda

Monday - October 13, 2008

Dr. Stuart L. Scott

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| 11:00-11:30 | <i>THE MODERN MULTIPHASE PRODUCTION SYSTEM - conventional versus multiphase, example field development strategies, game changing nature of multiphase production.</i> |
| 11:30-12:15 | <i>MULTIPHASE FLOW FUNDAMENTALS oilfield fluids, water-cut, slip, liquid holdup, velocities, flow regimes, stratified flow, slug flow, three-phase flow, multiphase metering.</i> |
| 12:15-1:00 | <i>OVERVIEW OF MULTIPHASE PUMPING TECHNOLOGIES – piston pumps, twinscrew, PCP, helicoaxial, comparison of operational envelopes, worldwide installation database.</i> |
| 1:00-1:30 | <i>PISTON PUMPS AND THERMODYNAMIC CONSIDERATIONS – vertical hydraulic piston pump, horizontal dual-acting piston pump, compression of a multiphase mixture (adiabatic and isothermal).</i> |
| 1:30-2:00 | <i>BREAK</i> |
| 2:00-3:00 | <i>TWIN-SCREW AND PC PUMPS – movement of fluids through pump, re-circulation systems, slip and pressure profile within pump, methods to model behavior, operational envelope.</i> |
| 3:00-3:30 | <i>HELICOAXIAL AND OTHER ROTODYNAMIC MULTIPHASE PUMPS – movement of fluids within helicoaxial, ESP's and side-channel pumps, operational envelope, need for liquid storage.</i> |
| 3:30-4:00 | <i>INSTRUMENTATION AND SPEED CONTROL – use of re-circulation, Variable Frequency Drives and Torque Converters for speed control, control strategies, vibration, sand, P/T.</i> |
| 4:00-5:00 | <i>CASE HISTORIES - Significant multiphase pump applications will be detailed from around the world. Case histories presented at the Multiphase Pump User Roundtable (MPUR) over the past 9 years will be summarized.</i> |
| 5:00-5:15 | <i>Course Evaluation & Adjourn</i> |