

Energy Institute

21st International North Sea Flow Measurement Workshop 2003

October 28-31, 2003
Tønsberg, Norway

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571
www.proceedings.com

ISBN: 978-1-60423-960-7

Some format issues inherent in the e-media version may also appear in this print version.

Energy Institute

21st International North Sea Flow
Measurement Workshop
2003

TABLE OF CONTENTS

Investigations of Density Transducers for Natural Gas Metering	1
<i>F. Weber, Physikalisch- Technische Bundesanstalt, Germany</i>	
Guidelines for efficient improvement of accuracy in oil and gas flow measurements.....	24
<i>Risto Kuoppamäki, Indmeas Oy, Finland</i>	
Transient Diffraction Effects in Ultrasonic Meters for Volumetric, Mass and Energy Flow Measurement of Natural Gas.....	31
<i>Magne Vestrheim, University of Bergen, Norway</i>	
Wet Gas	
Venturi Meters in Wet Gas Flow	58
<i>D. G. Stewart, D. Hodges and G. Brown, National Engineering Laboratory, UK</i>	
Penguin Wet Gas Measurement	73
<i>Ian M. Wood, Shell U.K. Exploration & Production, UK, Paul Daniel, Alan Downing, Solartron ISA, UK</i>	
Suitability of Dry Gas Metering Technology for Wet Gas Metering	96
<i>D. G. Stewart and D. Hodges, National Engineering Laboratory, UK</i>	
Wet Gas Allocation on the Canyon Express Project.....	113
<i>Chris Cooley, TotalFinaElf Chip Letton and / Jim Hall, Letton-Hall Group</i>	
New Method to Determine the Liquid Content of a Wet gas Stream and Provide a Sample of the Liquid Phase for Composition	134
<i>Mark Jiskoot, Jiscoot Autocontrol Ltd, UK and Ken Payne, Amec, UK</i>	
Wet Gas Experience with Single Path Ultrasonic Meter	N/A
<i>Skule Smørgrav,FMC Kongsberg Metering AS, Norway</i>	
Flow meter Applications.....	
The Transit Time Difference Ultrasonic Gas Meter - A Reassessment	144
<i>Klaus J. Zanker, Tom Mooney, Daniel Industries, USA</i>	
Research Developments In Wet Gas Metering with V-Cone Meters	159
<i>Richard Steven and, Phillip A. Lawrence, McCrometer, USA</i>	
Ageing Effects on Orifice Metering	180
<i>Michael Reader-Harris, NEL, UK</i>	
Latest advances in Ultrasonic Flow Measurement of Natural Gas using Externally Mounted, Non-intrusive Sensors.....	193
<i>Peter G. Espina, Douglas Baumoel, Controlotron Corporation, USA</i>	
GE-Panametrics Clamp-on Flow Meter, Results in Industrial Gas Applications.....	206
<i>Shirley Ao, R&D, and Jacob Freeke, GE-Panametrics, USA Steven Milford, GE-Panametrics, UK</i>	

Experience in Flow Metering	
Experiences with a Fiscal Metering System using Coriolis Meters.....	217
<i>Frank Svendsen, VTM AS, Norway</i>	
Long Term Operational Experience of Turbine Meters.....	229
<i>József Balla and F.Takáras, MOL Rt, Hungary</i>	
Operating Experience with two Ultrasonic Gas Meters in Series	238
<i>Trond Folkestad,Dag Flølo, Hallvard Tunheim and Øyvind Nesse, Norsk Hydro ASA, Norway</i>	
Krohne Altosonic-V, with Master Meter Approach - Rough Road to Success with Oil Ultrasonic Fiscal Meter at Snorre B	265
<i>M. J. Dalström, Statoil ASA, Norway</i>	
Metering - the Challenges of Satellite Developments	280
<i>Rosalind Rowe, Mike Carnegie, Shell U.K. Exploration and Production</i>	
Standards and Regulations	
The Harmonized high-pressure Natural Gas cubic meter of Germany and The Netherlands	N/A
Gerg Project: Wide-Range Reference Equation of State for Natural Gases	295
<i>M. Jaeschke, Ruhrgas AG, Germany, A. Benito, Energas, Spain,A. Fredheim, Statoil ASA, Norway, J.-M. Henault, Gaz de France, P. v. Wesenbeeck, Gastransport Services, the Netherlands, B. Viglette, Snam Rete Gas, Italy, R. Klimeck / O. Kunz / W. Wagner, Ruhr Universität Bochum, Germany</i>	
API Draft Standard - Measurement of Liquid Hydrocarbons by Ultrasonic Flow Meters using Transit Time Technology	310
<i>Andre de Boer, Krohne, The Netherlands</i>	
Multiphase	
Operation and Evaluation of a Roxar Multiphase Meter in Sour Field Environment	318
<i>Joe J. S. Shen, ChevronTexaco Exploration & Production Technology Co, USA S. J. Vierkandt and K. A. Ogden, Tengizchevroil, Kazakhstan</i>	
Flow Measurement in Sub Sea Installations	336
<i>Martin Svennungsen, Svein Petter Hanserud, Ole Vidar Jonsjord, Arne Daae Hagen,</i>	
Phase Watcher VX Multiphase Flowmeter Heidrun Experience and Analysis	354
<i>Dr. Paul Ove Moksnes, Framo Engineering, Norway, Knut Skaardalsmo, Statoil ASA, Norway</i>	
Downhole Fiber Optic 3-phase Flow Meter Field Test at BP Mungo	N/A
<i>Espen S. Johansen, Weatherford, USA</i>	
Measurement Methods and Equipment	
Flare Meter Monitoring Method, and Flare Meter High Velocity Extender	379
<i>Maron J. Dahlström, Statoil ASA, Norway</i>	
Multibeam Ultrasonic Liquid Flow Meter for Fiscal Metering and Custody Transfer Applications.....	390
<i>Jean Luc Guizot, Faure Herman Intertechnique,France</i>	