



# Multiphase and Wet Gas Flow Measurements in Conventional and Unconventional Data Driven Environment

28–29 January 2020 | The San Luis Resort, Spa & Conference Center | Galveston, Texas, USA

In the new world of maximizing recovery while continuing to lower operational costs, operators need reliable digital technology. Flow rate measurements are the backbone to reservoir management and to maximize recovery. Multiphase and wet gas flow metering technologies are critical tools to meet the new market-driven demands. While these technologies have been commercially available for a couple of decades, the changing operational environments and evolving digital paradigms necessitate a fresh look and renewed discussion on its applications. Traditional separators provide dual functionality of gravitational phase separation and then measurement of separated single-phase flow. Multiphase flow measurement devices eliminate the need for phase separation to measure flow rate, thus expanding the options available to the operator to optimize OPEX while

maximizing recovery via high frequency measurements. Multiphase and wet gas meters, as well as virtual meters, have been used for reservoir and process management, regulatory reporting, allocation, and custody transfer. These devices are compact, convenient to deploy, provide real-time measurement, and are relatively low maintenance.

Multiphase and wet gas metering hardware and associated flow interpretation readily integrates with, and form underpinnings of, progressive digital oilfield architectures. The meters provide real-time measurement that meshes well with surface and downhole streams of pressure, temperature, vibrations, etc. Data analytics efforts are enhanced with increased test frequency and MPFM offer the potential for shorter and more frequent unmanned well tests. For oil and gas wells producing

from unconventional and tight reservoirs that exhibit significant transient flowing behavior and rapid production declines, increased test frequency along with real time measurement serve as important tools for optimizing production.

Successful use of technology requires deeper understanding of challenges and methods to overcome them. Also, aspects such as costs, regulatory requirements, accuracy, repeatability, maintenance-needs, fluid characterization, and algorithm improvements need to be discussed. This workshop, which encompasses diverse participation from operators, service companies, research groups, and academia, will promote such discussions and exchange of ideas to harness multiphase flow measurement technology to fulfill the goal to maximize recovery while lowering operational costs.

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## Who We Are

SPE is the largest individual member organization serving managers, engineers, scientists and other professionals worldwide in the upstream segment of the oil and gas industry.



## Tuesday, 28 January

0700–0800

Grand Ballroom Lobby

### Registration Check-In

0700–0800

Grand Ballroom Lobby

### Continental Breakfast

0800–1000

Grand Ballroom AB

### Session 1: Keynote and Opening Session

#### Session Chairpersons:

Rajan Chokshi, Accutant Solutions

Nikhil Joshi, Moulinex Energy

This session will cover what originally caused multiphase and wet gas measurement to be a necessity in the oil and gas business; the history of the technology; the stakeholders and performance owners; and looks towards the future by posing the question of “What and Where Next”.

- **Past, Present, and Future of MPFM in the Oil and Gas Sector**  
Bob Webb, RA Webb Consulting

1000–1030

Grand Ballroom Lobby

### Coffee Break and Posters

1030–1200

Grand Ballroom AB

### Session 2: MPFM/WGFM Integration and Use Within Digital Oilfield Architectures

#### Session Chairpersons:

Amin Amin, Belsim Engineering;

Neeraj Zambare, Kongsberg

MPFM/WGFM integration and use within digital oilfield architectures and strategy examines how multiphase measurement technology is deployed within integrated systems/digital twin applications and used to leverage enhanced production opportunities. This session also includes virtual and physical meter discussion and stand-alone flow sensing.

The session discussions are meant to touch at any type or scale of data integration involving the use of MPFM/WGFM, or their underlying measurements. This of course would depend on the sought benefit and the application. A short but not limited list of such applications could be:

- Way to integrate MPFM with surface facilities: well testing or continuous well rate determination
- Handling MPFM measurement consistency between subsea and topside installations, especially in the presence of different MPFM measuring technologies
- Use of MPFM dynamic response in transient flow assurance applications
- Production configuration scenarios: individual wells, commingled wells/streams, test headers/manifolds
- Integration of MPFM with well testing operations; pressure drop (back pressure), test frequency, dynamic response, transient test analysis (rate-pressure convolution)
- Data integration from different sources: modeling techniques, measures of improvement (KPIs)
- Similarity and dissimilarity of MPFM and VFM - measurement and modeling, common modes or not so common, complementing roles/backups
- MPFM use with VFM: physical flowrate measurement for VFM tuning, or as an integral part of the VFM model

- **Artificial Intelligence Application in Well Test Optimization by Using MPFM**  
Ziqiong Zheng, Haimo America

- **Assessment of Allocation Systems: Combining Data Validation and Reconciliation Scheme and PVT Simulations—WGM Field Case Study**  
Dennis van Putten, DNV GL

- **A Complete Metering Approach for a Successful Field Startup**  
Danny Golczynski, Wood

1200–1330

Grand Ballroom CD

### Lunch

1330–1500

Grand Ballroom AB

### Session 3: Multiphase and Wet Gas Flow Meter Performance Surveillance and Validation

#### Session Chairpersons:

Matt Zimmerman, BP;

Alex Vera, Pietro Fiorentini USA

Examines the techniques used to perform measurement performance surveillance and validation of multiphase flow measurement technologies in the field. Techniques include the use of meter diagnostics, process monitoring, material balances, fluid sampling and analysis, and comparison to reference measurement systems.

- **MPFM Performance Surveillance and Validation: A Look at the Impact of Small Things on the Big Picture**  
Brandon Buquet, Anadarko
- **Detailed Multiphase Meter Validation Process—Beyond Standard Volumes**  
Robbie Lansangan, TechnipFMC

1500–1530

Grand Ballroom Lobby

### Coffee Break and Posters

1530–1700

Grand Ballroom AB

### Session 4: MPFM/WGFM Input Fluid Parameter Characterization

#### Session Chairpersons:

John Lievois, Weatherford;

Dilhan Goonasekera, OneSubsea

Fluid property characterization is important for any type of production well testing and is especially important for successful use of multiphase or wet gas flow meters. This session will focus on the fluid property data required to maintain an accurate and reliable measurement throughout the life of field. The session will also explore the impact of subsea water characterization for offshore gas wells.

- **Thallenges and Considerations for MPFM/WGFM Fluid Property Configuration—An Operator’s Perspective**  
Matt Zimmerman, BP
- **The Impacts of Measurement: How Measurement is Used Beyond Allocation**  
Eric Grzelak, OneSubsea
- **Practical Challenges in Generating and Deploying Consistent PVT Data**  
Daniel Rodriguez, Weatherford

1700–1830

Pool Deck

### Networking Reception

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## Wednesday, 29 January

0700-0800

**Continental Breakfast**

**Grand Ballroom Lobby**

0800-0930

**Session 5: MPFMs in Tight Reservoir Applications**

**Grand Ballroom AB**

**Session Chairperson:**

Flavia Viana, Chevron ETC

This session will cover current practices and trends in the use of MPFMs for production measurement in tight reservoirs. A panel session will be facilitated to explore the use of MPFMs as an alternative to traditional well testing, associated challenges and added benefits, and the potential for expanded deployment to sustain larger production of MPFMs at much lower capital cost.

- **Benefits of Using MPFM; Offshore and Conventional Reservoir Perspectives on Land Unconventional Applications**  
Imed Benlizidia, Saudi Aramco; Brandon Buquet, Anadarko
- **Range of Operating Conditions and Challenges in Shale Applications**  
Ramiro Cardenas, Verdun Oil; Liviu Husoschi, Schlumberger
- **Lease Ownership and Production Allocation in Shale Applications**  
Nikhil Joshi, Moulinex Consulting
- **Vendor Deployment Survey**  
Brian Thigpen, Chevron; Flavia Viana, Chevron ETC

0930-1000

**Coffee Break and Posters**

**Grand Ballroom Lobby**

1000-1130

**Session 6: MPFM/WGFM Specification, Testing, and Life of Field Design**

**Grand Ballroom AB**

**Session Chairpersons:**

Lars Farestvedt, TechnipFMC;

Sharon McCurdy, Emerson Automation Solutions

Examines the mechanical and measurement specifications of subsea, offshore and onshore MPFM/WGFM applications, including meter life expectancy. Reviews testing/calibration/maintenance requirements prior to, during, and after meter start-up in the field, and how to optimize performance through life of field.

- **Sources of and Determination of Non-Metering Uncertainties in Multiphase Meter Performance Evaluation**  
Robbie Lansangan, TechnipFMC
- **Testing Life of Field Integration Options for MPFM's in Pad-Based Unconventional Operations**  
Stuart Scott, ConocoPhillips
- **Multiphase Meter Placement in Deepwater**  
Nikhil Joshi, Moulinex Energy

1130-1300

**Lunch**

**Grand Ballroom CD**

1300-1500

**Session 7: What is the Opportunity for Multiphase Flow Metering with the Significant Change Over the Last 5 Years: Oil Crisis, LNG & Shale Growth, Digitalization...?**

**Grand Ballroom AB**

**Session Chairpersons:**

Rajan Chokshi, Accutant Solutions

Nikhil Joshi, Moulinex Energy

Bruno Pinguet, TUV SUD National Engineering Laboratory

Over the last 30 years, barely 10,000 Multiphase meters have been sold worldwide. The trend of acceptance, if slightly higher with time, is not reaching an outstanding sales level. Meanwhile, newcomers are present; this means that some of the work and knowledge established over the years were right and some wrong. Multiphase flow is at the core of oil and gas production, how can we gain from the MPFM and WGFM? Through 2 hours of discussion, we expect to address at least 5 topics used as a milestone.

## Tuesday, 28 January and Wednesday, 29 January

**Knowledge Sharing Poster Sessions** **Grand Ballroom Lobby**

Knowledge Sharing Posters allow one-on-one interactions with presenters and opportunities to study a particular concept at an appropriate level of detail. Subject matter varies, but topics are consistent with the other technical sessions.

- **Magnetic Resonance Multiphase Flow Measurement**  
Mark van der Zande, KROHNE
- **Upstream Production Measurement Integration and Surveillance—Field Case**  
Vincent van der Bent, Neptune Energy; Amin Amin, Belsim Engineering
- **Advanced Multiphase Facility-AMF: A New Breadth of Testing Multiphase and Wet Gas Flowmeters**  
Anna Pieper, TUV SUD National Engineering Laboratory

**SPE**  
**workshop** Survey

Please take a moment and let us know your thoughts on this event!



Scan the QR code with your device camera to take a quick 4 question survey after the workshop.

You can also access the survey at:  
<http://go.spe.org/20AGA3AttendeeSurvey>

## Workshop Ideas

Have an idea for a new workshop or forum?  
Let us know about it by completing this short online form: <http://go.spe.org/workshopform>

## General Information

**Accessibility:** Our events and functions are accessible to all attendees with wheelchairs. If you require special arrangements, please contact our staff at the registration desk.

**Alcohol Policy:** SPE recognizes the legitimate serving of alcoholic beverages in the process of conducting business and social activities. We also recognize that the use and consumption of alcohol carries with it the requirement for all attendees to consume those beverages responsibly.

**Commercialism:** In remaining consistent with workshop objectives and SPE guidelines, commercialism in presentations will not be permitted. Company logos should be used only to indicate the affiliation of the presenter(s).

**Continuing Education Units:** Attendees will receive 1.6 CEUs. One CEU equals 10 contact hours of participation. CEUs will be awarded through SPE Professional Development for participation and completion of an SPE workshop. A permanent record of a participant's involvement and awarding of CEUs will be maintained by SPE.

**Documentation:** Following the workshop, a URL containing released copies of the workshop presentations will be available to all attendees.

**Electronic Devices:** As a courtesy to the speakers and your fellow registrants, please turn off all electronic devices during presentations.

**Name Badges:** Please wear your badge at all times. It is a courtesy to your fellow registrants, speakers, and sponsors.

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Any person attending may be photographed or videotaped, and by your attendance, you give permission to use your image in possible future marketing publications including print, online, and video.

**Workshop Format:** Workshops maximize the exchange of ideas among attendees and presenters through brief technical presentations followed by extended Q&A periods. Focused topics attract an informed audience eager to discuss issues critical to advancing both technology and best practices.

Many of the presentations are in the form of case studies, highlighting engineering achievements and lessons learned. In order to stimulate frank discussion, no proceedings are published and members of the press are not invited to attend.



Society of Petroleum Engineers

The Society of Petroleum Engineers (SPE) is a not-for-profit organization. Income from this event will be invested back into SPE to support many other Society programs. When you attend an SPE event, you help provide even more opportunities for industry professionals to enhance their technical and professional competence. Professional awards, scholarships, the Distinguished Lecturer program, OnePetro, *JPT* and the Competency Management Tool are just a few examples of programs that are supported by SPE.

## Upcoming North American SPE Events

Date	Title	Location
18–19 February	<b>SPE Workshop: Smart Integration in Production System Modeling</b>	The Woodlands, Texas
18–19 March	<b>SPE Canada Unconventional Resources Conference</b>	Calgary, Alberta
19 March	<b>URTeC One-Day Workshop</b>	Midland, Texas
14–16 April	<b>SPE Workshop: Rate/Pressure Transient Analysis in Unconventional Reservoirs-Solutions for Practical Problems</b>	Galveston, Texas
20–21 May	<b>SPE Workshop: Subsurface Data Analytics</b>	Kananaskis, Alberta