Conventional Production Facilities with Unconventional Resources

Robbie Lansangan
Independent Consultant
A look back in time...

• In 1998, the Vice Chairman of the Board at Chevron gave a speech at the Construction Industry Institute’s Annual Convention

  – Here are some excerpts:

  “The price of oil today is about $14/bbl – that’s about $6 less than this time last year. And it’s affecting our short-term cash flow and earnings, I can tell you. What I can’t tell you is what the oil price is going to be tomorrow – and neither can anyone else. What we know is that there is a huge surplus of oil out there that’s going to take awhile to draw down.”

  “...But you might ask, how are you going to stick with your program and achieve your goals in light of low oil prices? There is only one way I know to do it, and that’s to keep increasing our efficiency [capital and operating efficiency].
US shale gas production

- Shale gas production in 2015 was 37.4 Bcf/d, accounting for 50% of total US natural gas output.
- Projected to reach 79 Bcf/d in 2040.
Tight oil production in 2015 was 4.9 MMbbl/d, accounting for 52% of total US natural gas production; 7.1 MMbbl/d in 2040. From 2015 to 2017, production to decrease by 0.7 MMbbl/d.
Tight oil and shale gas production scenarios

- Technologies that increase ultimate recovery, reduce cost and increase productivity have greater impact than oil/gas price

Source: Future US tight oil and shale gas production depends on resources, technology and market, EIA, Aug 22, 2016
Technology Advances

• Drilling and completions technology improvements have reduced cost, increase efficiency and well productivity
  – More efficient hydraulic fracturing techniques
  – Multiwell pad drilling to multilaterals
  – New well completion designs
Cost reduction opportunities

• Operating cost for lease operation
• Production facilities
  – Gathering, processing and transport
  – Gas and liquid export facilities
  – Water disposal
What can we add in our toolbox?

• Multiphase and wet gas meters
• Downhole flow meter
• Virtual flow metering
• Fit for purpose fluid surveillance and sampling program
• Big data harvesting and analytics
Multiphase and Wet Gas Meter

- Continuous flow measurement of oil, gas and water w/o phase separation
- A wet gas meter is a multiphase meter that operates with >96% gas volume fraction
- Turn down range of 10:1 typical, extendable by field configuration
- Compact; lower dP compared to separator
Conventional separators vs Multiphase or Wet Gas Meters for Production

- Wellhead MPFM can replace conventional separators and associated safety devices; reduce CAPEX in new dev
- Inline MPFM can replace portable well tester; additional HSE benefits by eliminating venting, driving hazards, and HC inventory transport
MPFM in Well Cleanup, Flowback and Well Testing

• MPFM provides real-time production data to gauge well productivity versus plan

• Elimination of conventional separators in well completion allows wells to be brought on stream at lower cost and faster turnaround time
Other benefits of MPFM

- Field optimization possible through real-time well level production data
- Well condition monitoring allows early intervention decisions
- Reservoir surveillance for effective management and delivery of depletion plan and FID volumes
- Production data density provides opportunity for reservoir model validation or improvement
Keys to successful implementation

• Deep knowledge of the tool
  – What is the best tool for the application?
  – What does it need to make it work? What does it need to keep it working?

• Organizational capability

• Vendor engagement to deliver the right tool at the right price

• Regulatory engagement to align requirements with tool capabilities and business outcome
Are you moving the dial to improve your capital and operating efficiency?

• Do you have a clear view of technologies and innovations that are relevant to your projects/operations?

• Do you have a fit-for-purpose technology identification, selection and deployment plan?

• Do you have the right people in the right place with the right skills to make technology work?
Implementation Example – Unconventional Heavy Oil
From “Petrozuta’s Multiphase Meter Application”

Authors:
Luigi Bortolin – Petrozuata
Parviz Mehdizadeh – Production Technology Inc.
Gordon Stobie – ConocoPhillips
Presented at TAMU Multiphase Users Round Table 2003.
Well Flow Optimisation

Extra Heavy Crude Flow vs Down Hole Diluent Injection Flow rate

well IJ-25-1
28/8/98-29/8/98
Overall Assessment

- In an unconventional operation (ESP/PCP driven, diluent injected wells), the MPM's capability for accurate well testing compare well with conventional test separator.

• Use of Multiphase Technology (MPM & MPP) in this new oil field development has proved to be an economic and technically viable option compared to conventional systems. The savings have been tentatively put at 40% in Capital terms and 35% for OPEX

• Capital savings have been stated as about $35MM
This standard addresses multiphase flow measurement in the production environment, upstream of the custody transfer (single-phase) measurement point, where allocation measurement for onshore, offshore, or subsea is applied. For other multiphase flow measurement applications such as reservoir management, well tests, and flow assurance, the standard can be used as a reference or guide. However, the focus of this standard is on those applications where the accuracy of multiphase flow measurement for allocation systems is required.

This document refers to existing standards and recommended practices to supplement the guidance it provides in this subject area. The document addresses principles used in multiphase flow measurement, multiphase metering types and classifications, assessment of expected performance, and selecting and operating multiphase measurement systems. Operational requirements or constraints are addressed, including expectations for flow meter acceptance, calibration criteria, flow loop and in situ verifications, and other guidance specific to different multiphase flow metering applications. The document does not address specific meter configurations.

This edition of API Manual of Petroleum Measurement Standards (MPMS) Chapter 20.3 supersedes API Recommended Practice 86-2005, which is withdrawn.
Let’s have a conversation...

Thank you for your time

www.linkedin.com/in/robbielansangan