Production Measurement & Allocation – CPMA 20.1

Robbie Lansangan, Ph.D.
Measurement Eng. Technical Authority
BP Upstream Global Projects
Presentation Outline

• What is CPMA and where does it fit in the API COPM?
  – Intent of the CPMA

• What are the CPMA Working Groups?
  – Brief description of the subsections
What is CPMA?

- CPMA – Committee on Petroleum Measurement & Allocation

* While all subsections 20.1 through 20.6 are working groups under CPMA, section 20.1 serves to introduce all the other sections and contain common subject matter.
What is CPMA’s SoW?

• CPMA serves to address and provide standardized guidance on measurement technologies and procedures associated with oil and gas production.

• Addresses the application of single-phase fluid measurement standards in typical production operations upstream of custody transfer points and before production streams are fully processed and/or stabilized.

• Recommendations for multiphase flow measurement, and the application of phase behavior calculations.

• Addresses periodic production well rate determination and the allocation of reference measurements of combined and/or commingled flows (typically custody transfer measurement) to the individual wells or production fields.
Where does CPMA reside?

- COMET
  - Education & Training
  - Tank Measurement
    - Tank Gauging
      - Metering
        - Calculations & Statistics*
          - Mass Measurement
  - Calculations & Statistics*

- COLM
  - Tank Measurement
  - Production Measurement
  - Allocation

- CPMA
  - Evaporative Loss Estimation
  - Accountability & Reconciliation
  - Marine Measurement
  - Statistics*
    - Physical Properties

- CELE
  - Accountable & Reconciliation
  - Marine Measurement

- COMA
  - Accountable & Reconciliation
  - Marine Measurement
  - Sampling, Sediment & Water
    - Gas Fluids

- COMQ/ASTM D02.02

- COGFM
  - Gas Fluids
  - Gas Measurement
What is the CPMA in relation to COPM

• The API Manual of Petroleum Measurement Standards (MPMS) produced by the COPM, addresses primarily custody transfer of fiscal-based measurement systems and operations

• CPMA addresses production allocation measurement upstream of the custody transfer point/s
* While all subsections 20.1 through 20.6 are working groups under CPMA, section 20.1 serves to introduce all the other sections and contain common subject matter.
Production Allocation Measurement Using Single Phase Devices

- Chapter 20.2 document addresses single-phase measurement techniques upstream of the custody transfer points where custody transfer conditions are not possible.

- Discusses measurement devices used in the allocation process and located downstream of the first stage of separation on a production facility.

- Addresses the common allocation measurement devices for liquid hydrocarbons, water, and gas including sampling and ancillary systems such as fuel, flare, and recirculation.

- Discusses configuration and operation of measurement equipment as well as discusses the production fluid processing and associated flow conditions and their affects on the quality of the measurement results.

- Provides methods for determining separator efficiencies and recommends corrective practices.
CPMA 20.3

• Multiphase Flow Measurement

– The 20.3 WG will address multiphase flow measurement in the production environment, upstream of the custody transfer (single-phase) measurement point.

– These applications include but are not limited to: measurement for reservoir management, well tests, and flow allocation from downstream reference measurements including onshore, off shore or subsea production systems.

– The document will provide practical standards and processes concerning multiphase flow measurement for regulatory authority, users and manufactures.
CPMA 20.4

**Draft Standard for Phase Behavior Application in Upstream Measurement & Allocation**

- This draft standard will provide a guideline on the proper application of phase behavior in upstream production measurement and allocation.

- While production measurement system and allocation processes could vary, there are base commonalities across the board in terms of phase behavior application.

- The draft standard scope will include minimum PVT data set requirements, fluid sample planning, PVT studies specific to production allocation, PVT data uncertainty, PVT model development, PVT model validation and PVT model maintenance.
Well Rate Determination

This document addresses the use of production facilities and associated measurement systems in order to determine the production rates (commonly called welltest results) of oil and gas wells.

Welltest information will be used to determine production quantities. This document will discuss the various reasons for performing periodic welltests and the various production operational scenarios associated with welltesting.

Specifically address the welltest operation resulting in the observed production rate of oil, gas, and water. Subsequently, the welltesting results are used for the determination of theoretical production quantities in production measurement and allocation systems.
Recommended Practice for Allocation of Commingle Production Quantities

This document will address the issues and give consideration for the allocation of commingled production quantities as it relates to the process of attributing the final (end-of-process, normally custody transfer) measured quantities of oil, gas, and produced water, back to the individual production sources and/or production wells. The range of operations will include production, upstream area gathering systems, and certain pipeline operations where phase change is inherent to the operation.

Primarily the RP will describe industry accepted allocation algorithms that recognize the various methodologies currently in use in major theaters of operation. The document will describe the integration of uncertainty terms in the allocation formulation (uncertainty based allocation) and address measurement system and commingling scenarios where uncertainty based allocation is appropriate. Standard volume, mass, energy, and component-mass based allocation systems will all be described.
CPMA 20.1

• Overview of Production Measurement and Allocation
  – This section is an introductory document where all the subsequent subject areas within the production measurement arena are touched upon in an overview fashion.

  – Some subjects that truly apply to many or all of the specific areas may be housed in further detail within the revised 20.1 section. For example defined terms and computational procedures from measured quantities to standard quantities may be addressed in section 20.1 due to the general applicability of these particular subjects.
In Summary

- CPMA provides guidance and standards in measurement systems and procedures for oil & gas production upstream of the custody transfer point

- QUESTIONS?