Manual of Petroleum Measurement Standards Draft Standard

Application of Hydrocarbon Phase Behavior Modeling in Upstream Measurement and Allocation Systems

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American Petroleum Institute
1220 L Street, NW
Washington, DC 20005
USA
standards@api.org

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Introduction

This document establishes a framework to develop, implement, and manage the application of hydrocarbon phase behavior modeling in upstream measurement and allocation systems. The applied phase behavior modeling addressed in this document refers to a process simulation model (PSM) incorporating an equation of state (EOS) description of the phase behavior, or pressure, volume, temperature (PVT) properties, of the fluids within the modeled process. The intent of this document is to provide operators with a consistent and transparent approach for applying and managing an EOS-based PSM within an upstream measurement and allocation system. It is not intended to prescribe a particular mathematical phase estimation (i.e. EOS), process simulation (i.e. PSM), or allocation method. Allocation methodologies are addressed in API *MPMS* Chapter 20.1.

Application of Hydrocarbon Phase Behavior Modeling in Upstream Measurement and Allocation Systems

1 Scope

This document provides requirements and guidelines for the application of hydrocarbon phase behavior modeling in upstream measurement and allocation systems. The requirements and guidelines apply to the development, implementation, and performance management of a process simulation model (PSM) incorporating an equation of state (EOS) description of phase behavior. This includes functional specifications, validation, and maintenance of the PSM, EOS specification and implementation, and fluid compositional specification and validation.

2 Normative References

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

API *Manual of Petroleum Measurement Standards* (*MPMS*) Chapter 20.1, *Allocation Measurement*

API *MPMS* Chapter 20.2, *Production Allocation Measurement Using Single-phase Devices*

API *MPMS* Chapter 20.3, *Measurement of Multiphase Flow*

API *MPMS* Chapter 21.1, *Electronic Gas Measurement*

API Recommended Practice 551, *Process Measurement Instrumentation*

3 Terms, Definitions, Abbreviations, and Symbols

3.1 Terms and Definitions

For the purposes of this document, the following terms and definitions apply.

3.1.1
acentric factor
An EOS parameter that provides enhanced temperature dependence of the intermolecular potential of complex fluids from simple ideal fluids.

3.1.2
actual conditions
Conditions of pressure and temperature of the fluid at the point where fluid properties or flows are measured.

3.1.3
allocation
The mathematical process of determining the proportion of produced fluids from individual entities (zones, wells, fields, leases, or producing units) when compared with the total production from the entire system (reservoir, production system, and gathering systems) in order to determine value or ownership to attribute to each entity.

3.1.4
binary interaction parameter
An EOS fitting parameter used to account for the nonideal interaction between molecules that addresses the difference between association terms in the EOS model compared with experimental data.