



PETROSTREAMZ

# Advances in Molar Wellstream Computation from Well Test Measurements

**SPE-185988**

**at SPE Reservoir Characterisation  
and Simulation Conference and  
Exhibition 2017**



Mohammad Faizul Hoda  
Petrostreamz AS



Arif Kuntadi  
Petrostreamz AS



Arnaud Hoffmann  
Petrostreamz AS

## Abstract

Well-test rates are measured with special test separators operating at varying pressures and temperatures during initial production tests for a new well and during periodic tests used to monitor performance and allocate production of multi-well production separators. Often the separator oil API gravity and the separator gas specific gravity (SG) is measured, in addition. Converting test separator gas and oil rates to a common (fixed) set of surface separator conditions is necessary to ensure consistent rate allocation and development of valid inflow performance relations. This is also needed when interpreting the well's performance during the test or over time and against other wells.

This paper provides an advanced method based on EOS (equation of state) calculations that provide such consistency. The measured API & SG are considered additional data to be matched along with the well-test rates. The proposed method converts the reported test rates to a molar compositional wellstream rate. The resulting compositional wellstream rate, defined with a set of components for a particular EOS model, will exactly reproduce the reported test rates at the separator conditions prevailing when rates were measured. In addition, the method uses on-the-fly gamma model adjustment to match the oil API gravity and on-the-fly Hoffman straight line model slope adjustment to match the gas SG.

The requirements for converting test rates to a compositional wellstream include (1) an appropriate EOS model and (2) any reasonable estimate of the wellstream composition – the "seed feed". The seed feed is usually the previously determined wellstream composition from an earlier test. The paper also discusses an advancement on preparing more accurate seed feed composition on well basis. The seed feed is flashed at test separator pressure and temperature, resulting in equilibrium gas and equilibrium oil compositions. The separator equilibrium compositions are recombined in a specific ratio that yields exactly the test separator gasoil ratio with the EOS model. The method includes the matching of API and Gas SG measured during the well-test.

Additionally, a method of improved seed feed estimation is presented. Such improved molar wellstream can form a basis for improved compositional well allocation solutions.

---

**ADDRESS**

Skonnertvegen 7  
7053 Ranheim  
Norway

**LANDLINE**

+47 73 10 02 60  
**FAX**  
+47 73 84 80 81

**EMAIL**

info@petrostreamz.com  
**WEBSITE**  
www.petrostreamz.com

**PETROSTREAMZ**