

## Northwest Pipeline Gas Quality Sampling and Analysis Procedures

1. It is the policy of Northwest Pipeline LLC (Northwest) that sampling used in posting gross heating value and relative density be performed in accordance with GPA-2166 (latest revision). All gas samples will be collected using a probe extending into the center one-third of the diameter of the pipeline, located on the top of a horizontal line, where practical. Calculations for gross heating value and relative density will be performed per GPA-2172 (latest revision).
2. It is the policy of Northwest that gas analysis used in posting for Nitrogen, Carbon Dioxide and Hydrocarbon Compounds be performed using gas chromatography analysis in accordance with GPA-2261(latest revision). Physical constants used in the calculations are from GPA-2145 (latest revision) with the following C6+ split: 50% n-Hexane, 50% n-Heptane.
3. It is the policy of Northwest that gas analysis used in posting for H<sub>2</sub>S and Sulfur Compounds be performed using laser absorption spectrometer, lead acetate tape, or other equivalent analytical devices that meet the requirements of the ASTMmethod (latest revision) appropriate for the analytical device.
4. It is the policy of Northwest that gas analysis used in posting for water content be performed using analysis techniques and methods that meet ASTM D 5454 (latest revision).
5. It is the policy of Northwest that the hydrocarbon dew point (HDP) be calculated using data acquired through gas chromatography analysis or be determined using a dedicated on-line HDP analyzer. When chromatograph results are used, the CHDP will be calculated using the Peng-Robinson equation of state and an assumed split of 60/30/10% for C<sub>6</sub>/C<sub>7</sub>/C<sub>8+</sub>, respectively. Northwest will alter the split relative to the proportion of C<sub>6</sub>, C<sub>7</sub>, and C<sub>8+</sub> if an interconnect operator wishes to provide a current extended analysis (through C<sub>9+</sub>) from an approved analytical lab. The interconnect operator will allow Northwest to witness the sample collection and will agree to a periodic testing schedule.