$$CH_4 = \frac{A_e}{\rho_{ref}} \times \sqrt{\frac{2000 \times K}{K-1} \times P_a \times \rho_a \times \left[\left(\frac{P_{atm}}{P_a} \right)^{2/K} - \left(\frac{P_{atm}}{P_a} \right)^{(K+1)/K} \right]} \times t \times \left[\frac{T_{SC} \times P_{ge}}{T_{ge} \times P_{SC}} \right] \times \rho_{ref} \times 0.001$$

Where:

CH_4 = Annual CH_4 emissions attributable to third party pipeline puncture incident when the flow is not choked, in metric tons;

A_e = Size of the hole in the pipe, in square metres;

K = Specific heat ratio of CH_4, namely 1.299;

ρ_{ref} = Density of CH_4, namely 0.690 kg per cubic metre at standard conditions;

ρ_a = Density of CH_4 inside pipe at the damage point, in kilograms per cubic metre;

P_a = Absolute pressure inside pipe, determined in accordance with paragraph 3 of QC.33.4.8, in kilopascals;

P_{atm} = Absolute pressure at the damage point, in kilopascals;

R = Universal gas constant, namely 8.3145 kPa m^3 per kilomole per degree kelvin;

t = Duration of the leak caused by the puncture incident, in hours;

T_{SC} = Temperature at standard conditions of 293.15 kelvin;

T_{ge} = Temperature of gas emitted, in kelvin;

P_{ge} = Absolute pressure of gas emitted, in kilopascals;

P_{SC} = Pressure at standard conditions of 101.325 kPa;

0.001 = Conversion factor, kilograms to metric tons.