$$CH_4 = \frac{3.6x10^6 \times A}{\rho_s} \times \sqrt{\frac{K \times MW}{1000 \times R \times T}} \times \frac{P_a \times M}{\left(1 + \frac{K-1}{2} M^2\right)^{\frac{K+1}{2(K-1)}}} \times t \times \left[\frac{T_{SC} \times P_{ge}}{T_{ge} \times P_{SC}}\right] \times \rho_s \times 0.001$$

Where:

CH_4 = Annual CH_4 emissions attributable to a third party catastrophic pipeline rupture or a pipeline puncture incident when the flow is choked, in metric tons;
A = Cross-sectional flow area of the pipe, in square metres;
ρ_s = Density of CH_4, namely 0.690 kg per cubic metre at standard conditions;
K = Specific heat ratio of CH_4, namely 1.299;
MW = Molecular weight of CH_4, namely 16.043 kg per kilomole;
R = Universal gas constant, namely 8.3145 kPa m^3 per kilomole per degree kelvin;
T = Temperature inside pipe, in kelvin;
P_a = Absolute pressure inside pipe, determined in accordance with paragraph 2 of QC.33.4.8, in kilopascals;
M = Mach number of the flow, calculated using equation 33-17 when M is equal to or smaller than 1 or a value of 1 in other cases;
t = Duration of the leak caused by a third party hit, 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;