GREENPATH ENERGY LTD

# What's in your Vent Gas?

## Background

Since the methane content of produced natural gas varies, the Alberta Energy Regulator (AER) set forth the venting limits in both a volume and mass basis. Starting January 2020, producers will need to comply with the venting limits, which section 8.3 of Directive 060 defines as:

> ***The duty holder must limit Overall Vent Gas (OVG) at a site to less than 15.0x10$^3$m3/month of vent gas per month or 9.0x10$^3$ kg/month of methane.***

The conversion is described in AER "Manual 15", equation 1: $\boldsymbol{M = V \times \emptyset_{CH4} \times \rho_{CH4}}$

M = the mass of methane [kg $CH_4$]
V = the volume of vent gas, corrected to standard conditions [$m^3$]
$\phi_{CH4}$ = the volumetric concentration of methane as a fraction, or molar fraction
$\rho_{CH4}$ = the density of methane at standard conditions = 0.67850 kg/$m^3$

## Case Study

At a site in Northern Alberta, the operators noticed high venting rates from their condensate tanks. They were concerned as the vent rates exceeded the monthly limit of 15.0x10$^3$m$^3$/month. They approached GreenPath to conduct a site audit.

Site measurements confirmed that the vent rate was 49,581 m$^3$/month, well above the stipulated volume limits.

While on site, GreenPath also deployed the Field Vent Gas Spectrometer to determine the proportion of components in the vent gas as summarized in Table 1.

| Component | Mole Fraction |
|---|---|
| H2S | 0.0000 |
| N2 | 0.0159 |
| C02 | 0.0021 |
| C1 | 0.0912 |
| C2 | 0.1678 |
| C3 | 0.3191 |
| C4 | 0.2615 |
| C5+ | 0.1424 |

*Table 1: Condensate Tank Gas Analysis*

Applying Equation 1:

$$\boldsymbol{M = 49,581\ \frac{m^3}{mth} \times 0.0912_{CH4} \times 0.67850\ \frac{kg}{m^3}}$$
$$\boldsymbol{= 3068\ kg_{CH4}}$$

So, while the volume limit of vent gas is exceeded, the mass limit of methane is not. According to AER, only one of these two needs to be met to be compliant.

*Figure 1: GreenPath's Field Vent Gas Spectrometer*

## Conclusion

Understanding the vent gas composition is key to ensuring cost-effective abatement strategies.

**Contact GreenPath for vent gas measurement and management.**