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This Synopsis describes actions that an organisation can take to help manage methane emissions. Any actions or recommendations are not mandatory; they are simply one effective way to help manage methane emissions. Other approaches might be as effective, or more effective in a particular situation. What readers choose to do will often depend on the circumstances, the specific risks under management and the applicable legal regime.
Checklist
Methods of reducing methane emissions from pneumatic devices:

- Keep an accurate inventory of pneumatic controllers and pumps powered by natural gas.
- Replace pneumatic devices with electrical or mechanical devices where practical.
- If pneumatic devices are used, eliminate emissions by using compressed air rather than natural gas to power them.
- If using devices powered by natural gas is the best option, replace high-bleed controllers with alternatives with lower emissions.
- Include pneumatic devices in an inspection and maintenance program and report emissions from these devices in an annual inventory.

Pneumatic devices are powered by gas pressure. They are mainly used where electrical power is not available. The two main types of pneumatic device used in the oil and gas industry are:

- pneumatic controllers, which control conditions such as levels, temperatures and pressure; and
- pneumatic pumps, which inject chemicals into wells and pipelines or circulate dehydrator fluids.

Millions of pneumatic devices, mostly pneumatic controllers, are used in the oil and gas industry. These devices, when powered using natural gas, can be one of the largest sources of methane emissions in petroleum and natural gas supply chains.

The methane released from pneumatic devices comes from the natural gas that is vented while powering the device, so preventing or reducing emissions can also often have economic benefits. The International Energy Agency (IEA) has estimated that methane emissions could be reduced by more than 11,000 kilotons (kt) globally from pneumatic devices – more than 7,000 kt from pneumatic controllers and more than 4,000 kt from pneumatic pumps – by using best practices for reducing methane emissions. This represents about 15% of the total global emissions of methane from oil and gas operations.

Methods of reducing methane emissions from pneumatic devices range from preventing emissions, to reducing emissions, to repairing those devices with emissions that are higher than expected.

Methane emissions from pneumatic devices can be reduced by:

- replacing pneumatic devices with electrical pumps or controllers;
- replacing pneumatic devices with mechanical controllers;
- using compressed air rather than natural gas to power pneumatic devices;
- replacing ‘high-bleed’ pneumatic devices with intermittent or ‘low-bleed’ devices; and
- inspecting devices and repairing those that release emissions that are higher than expected.
Methods of reducing methane emissions

Replace pneumatic devices with electrical pumps or controllers
At remote locations where electricity is not readily available, circulation pumps in glycol dehydration units, and chemical injection pumps used to inject chemicals into wells and flow lines, are often powered by pressurized natural gas. Chemical injection pumps run at relatively low volumes (releasing roughly 10 cubic meters of natural gas a day for methanol injection pumps at well sites), while circulation pumps in glycol dehydration units may release hundreds of cubic meters of natural gas a day.

These pumps can be replaced by solar-powered electric pumps and standard electric pumps. Similarly, pneumatic controllers can be replaced by electrical devices where electricity is available.

Replace pneumatic devices with mechanical controllers
Pneumatic devices used to control pressure levels can be replaced with mechanical controllers. At low-pressure, low-volume wells, mechanical dump valves (rather than pneumatic dump valves) have been installed on vertical separators. Mechanical controllers have also been used at midstream dehydration facilities.

In separators operating at high pressure and high volumes, the dump valve needs to be continuously throttled, so fluids can constantly flow out of the vessel. As pressure and production decline, the need for pneumatic throttle control may be able to be replaced by separators with mechanical dumps.

Use compressed air rather than natural gas from the well to power pneumatic devices
Using compressed air rather than pressurized natural gas eliminates the methane in vented gas. Due to the cost of compressed-air systems, at present they are mainly used at locations, which use relatively high rates of gases to drive pneumatic devices.

Replace high-bleed (high-emitting) pneumatic devices with intermittent or low-bleed devices
High-bleed pneumatic controllers have vent rates that are typically more than 1 standard cubic meter per hour (scm/h). At these rates, natural gas with a value of more than US$1000 a year is lost from each high-bleed device. If the operating conditions do not need high-bleed devices, low-bleed or intermittent controllers, with average vent rates of between 0.03 and 0.4scm/h, can significantly reduce methane emissions and the loss of natural gas.

Inspect devices and repair those that release emissions that are higher than expected
Several studies have found that a small fraction of pneumatic controllers tend to be responsible for the majority of methane emissions associated with pneumatic controllers. Although not all high emitting controllers are faulty, emission patterns indicate that some high emitting controllers are not operating as designed. Inspection and maintenance programs for pneumatic devices have been effective in reducing the number of high emitting pneumatic devices not operating as designed. New inspection and maintenance programs could be introduced specifically for these devices, or the devices could be added to an existing inspection and maintenance program, such as a program for detecting and repairing leaks.
Further information

MGP Website:
www.methaneguidingprinciples.org

OGCI:
https://oilandgasclimateinitiative.com

CCAC OGMP:

IEA Methane Tracker:
https://www.iea.org/weo/methane

Natural Gas STAR Program:
https://www.epa.gov/natural-gas-star-program