

GUIDANCE DOCUMENT

on the *Regulations Respecting
Reduction in the Release
of Methane and Certain
Volatile Organic Compounds
(Upstream Oil and Gas Sector)*
SOR-2018-66

OIL, GAS, & ALTERNATIVE ENERGY DIVISION

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DISCLAIMER

This document does not in any way supersede or modify the *Canadian Environmental Protection Act, 1999* or the *Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector)*, or offer any legal interpretation of those Regulations. Where there are any inconsistencies between this document and the Act or the Regulations, the Act and the Regulations take precedence.

Unless expressly provided otherwise, any document that is incorporated by reference into the Regulations is incorporated as amended from time to time. Any instructions contained in any directive or method referenced in the Regulations which use the word “should” are mandatory obligations for the purposes of the Regulations.

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1. INTRODUCTION

Environment and Climate Change Canada has developed this Guidance Document to facilitate the understanding of the *Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector)* made under the Canadian Environmental Protection Act, 1999 (CEPA). It provides regulatees (operators of upstream oil and gas facilities) and other stakeholders with a summary of the important aspects of the Regulations.

The Regulations come into effect on January 1, 2020, except for the requirements described in sections 3.3 (Venting), 3.5 and 3.6 (Pneumatic Controllers and Pneumatic Pumps) of this document, which will come into effect on January 1, 2023. The full text of the Regulations and associated documents are available on the CEPA Environmental Registry website:

<https://pollution-waste.canada.ca/environmental-protection-registry/regulations/view?ld=146>

For questions about the *Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector)*, please contact the following email address:

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2. APPLICATION AND KEY DEFINITIONS

2.1. GENERAL APPLICATION (SECTIONS 4 AND 46 OF THE REGULATIONS)

These Regulations specifically target methane (CH₄) and certain volatile organic compound (VOC) emissions. Hydrocarbon gas is composed of methane and/or volatile organic compounds, both of which are listed in the List of Toxic Substances in Schedule 1 of the *Canadian Environmental Protection Act (CEPA) 1999*. The Regulations limit the amount of hydrocarbon gas that may be emitted from a facility.

The term “hydrocarbon gas” is used throughout the regulations as a generic term. Use of this term allows the operator to maintain compliance with the requirements while not knowing the exact composition of the gas emitted. If the portion of the gas that is not hydrocarbons is quantified, volumes of gas emitted can be adjusted accordingly.

The Regulations apply to upstream oil and gas facilities located both onshore (sections 4-45 of the Regulations) and offshore (sections 46-53 of the Regulations). The definition of upstream oil and gas facility is described in section 2.2 of this document.

Offshore facilities are subject to their own requirements, set out in a distinct part of the Regulations. However, that part does not apply to a facility if the following two conditions are met:

1. a regulation under either the *Canada-Newfoundland and Labrador Atlantic Accord Implementation Act* or the *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act* is made that imposes requirements that are at least as stringent as these Regulations; and
2. the title of the regulation is published in the CEPA registry.

The operator of the facility must ensure that the requirements are met, which means a person who has the charge, management, or control of an upstream oil and gas facility. A facility must also be registered. At the time of registration, one person must be identified as the contact person in the name of the operator(s) at their discretion.

The various portions of the Regulations take effect on different dates. For example, while many of the requirements come into effect in 2020, the requirements for pneumatic devices do not come into effect until January 1, 2023. The various portions of the Regulations also have different record-keeping requirements. These are presented in tables in the applicable sections of this document. The List of Tables on page v can be consulted to for all record-keeping references.

The application of these Regulations to a facility depends on the equipment located at the facility, the amount of natural gas produced and/or received at the facility, and the location of the facility, as presented in Table 1.

Table 1 – Application of the Regulations

	Facility Type	Applicable Date (as of January 1 st)	Requirements for	Applicable Sections of the Regulations	Section of Guidance Document
Onshore	All Onshore Facilities	2020	Hydraulically-Fractured Well Completions	11-12	2.4 and 3.1
		2020	Centrifugal and Reciprocating Natural Gas Compressors ≥ 75 kW	14-19	3.2
	Whose Hydrocarbon Gas Produced and Received Exceed 60,000 m ³ Annually	2020	Leak Detection	28-36	2.3 and 3.4
		2023	Venting	26-27	2.3 and 3.3
			Pneumatic Controllers	37-38, 41	2.3, 2.5 and 3.5
Pneumatic Pumps	39-41	2.3, 2.5 and 3.6			
Other Equipment	42-44	2.3 and 3.7			
Offshore	All Offshore Facilities	2020	Venting	47-48	3.8
			Centrifugal and Reciprocating Compressors	49-51	3.9
			Leak Detection	52-53	3.10
ALL Facilities	All Facilities Subject to Any Requirement in the Regulations	2020	Registration and Record-Keeping	54-57	5

Each reference to cubic metres (m³) in this document means cubic metres of fluid at standard conditions (at a temperature of 15 degrees Celsius and at a pressure of 101.325 kilopascals).

2.2. DEFINITION OF UPSTREAM OIL AND GAS FACILITY (SECTION 2 OF THE REGULATIONS)

An upstream oil and gas facility includes all buildings, structures, and stationary equipment and:

- performs one of the following activities:
 - extraction of hydrocarbons from an underground geological deposit or reservoir
 - primary processing of hydrocarbons, meaning the removal of water, hydrocarbon liquids, sulphur compounds, or contaminants
 - transportation of hydrocarbons (including their storage for the purpose of transporting them), other than for local distribution
- is located on either a single site or multiple sites if those sites are contiguous or adjacent or if they form a network in which a central processing site is connected to one or more well sites by gathering pipelines.

This means that, where multiple sites are connected to a processing facility by pipelines, the operator must register them as a single facility. One facility cannot be severed into multiple smaller facilities.

An upstream oil and gas facility includes:

- gathering pipelines
- transmission pipelines
- single- or multi-well batteries
- natural gas gathering and boosting stations
- natural gas transmission compressor stations
- natural gas processing plants

2.3. APPLICATION BASED ON GAS PRODUCED AND RECEIVED (SECTION 20 OF THE REGULATIONS)

If, in the previous 12 months, a facility produced (meaning extracted) and/or received a total of at least 60,000 m³ of hydrocarbon gases, requirements respecting venting, the leak detection and repair program, pneumatic controllers, pneumatic pumps, and other equipment apply. Receiving is defined as receiving natural gas that has not yet been fully processed; volumes of fuel gas received should not be included in this total. See section 4.2 of this document for volume calculation methods.

For a facility that has been in operation for less than 12 months (including a well that has undergone completion), the venting, leak detection, pneumatic controller, pneumatic pump, and other equipment requirements apply if the estimated volume of hydrocarbon gas that the facility is expected to produce and/or receive in 12 months is at least 60,000 m³. If a facility has been in operation for at least one month, the volume is calculated by prorating the volumes in the months the facility has been in operation to obtain an annual value.

For example, if a facility that has only been operating for the month of January produces 10,000 m³ of hydrocarbon gases in that first month, the operator can estimate that over the next 12 months the facility would produce 120,000 m³ of hydrocarbon gases. In this example, the venting, leak detection, pneumatic controller, pneumatic pump, and other equipment requirements begin to apply for this facility in July, the month where the 60,000 m³ threshold is reached.

The 60,000 m³ threshold primarily targets facilities that are the largest emitters of methane. It is expected that the threshold will capture oil facilities with associated gas, as well as most natural gas facilities. Please note, for natural gas facilities, it is primarily the leak detection, compressor, and pneumatics requirements that result in reductions of emissions, as gas facilities do not generally routinely vent gas.

Table 2 – Record-Keeping: Gas Produced and Received

<p>For the first month that the venting, leak detection, pneumatic controller, pneumatic pump, and other equipment requirements apply, a record of:</p> <ol style="list-style-type: none"> 1. the month and the year 2. the combined volume of gas produced and/or received 3. an indication of the method used to determine that volume
<p>For each month where none of the venting, leak detection, pneumatic controller, pneumatic pump, and other equipment requirements apply, a record of:</p> <ol style="list-style-type: none"> 1. the gas-to-oil ratio and volume of hydrocarbon liquid produced or expected to be produced 2. the combined volume of gas produced and/or received 3. the volume expected to be produced by a well, if a well at the facility undergoes well completion during the month

NOTE: All records required under the Regulations must be made (and subsequently updated as necessary) within 30 days of the information to be recorded becoming available. Records must be kept for at least five years (and indefinitely if the information continues to be applicable). The records and documents must be kept at the facility to which they relate or at another location in Canada where they may be readily inspected. Records or document must be provided either immediately during facility inspections or within 60 days of a request by Environment and Climate Change Canada.

2.4. APPLICATION TO WELL COMPLETIONS INVOLVING HYDRAULIC FRACTURING (SECTION 11 OF THE REGULATIONS)

The Regulations apply to any facility that includes a well that undergoes hydraulic fracturing or re-fracturing, excluding a facility located in British Columbia that is subject to the well completion requirements set out in the guideline entitled *Flaring and Venting Reduction Guideline* or a facility located in Alberta that is subject to the well completion requirements set out in *Directive 060: Upstream Petroleum Industry Flaring, Incinerating, and Venting*. A well completion is the process of making a well ready for production. The well completions covered by these Regulations are wells that have been hydraulically fractured.

The Regulations are only applicable to a well whose production has a gas-to-oil ratio (GOR) of 53:1 or greater (based on the most-recent determination) prior to hydraulic fracturing. GOR is the ratio of the volume of hydrocarbon gas produced to the volume of the hydrocarbon liquid produced by the well. A sample calculation is provided in section 4.2 of this document.

2.5. DEFINITIONS RELATED TO PNEUMATIC DEVICES (SECTION 2 OF THE REGULATIONS)

Pneumatic controllers are devices that use pressurized gas to generate mechanical energy to control or maintain conditions needed to carry out a process. For example, a pneumatic controller may be used to maintain a certain liquid level in a separator. The Regulations contain requirements related to pneumatic controllers with a continuous bleed rate. Pneumatic controllers have a design bleed rate, which is specified by the manufacturer as the rate at which gas is expected to be continuously emitted from the device. Devices that bleed only intermittently would not be subject to the requirements.

The Regulations contain requirements related to pneumatic pumps. These devices use pressurized gas to generate mechanical energy to pump methanol. The pneumatic pump or pumps at a facility are subject to the Regulations if the pump or the group of pumps have, during a month, pumped methanol into a common stream at an average rate of 20 liters per day or more.

3. REQUIREMENTS

3.1. WELL COMPLETION REQUIREMENTS (SECTIONS 11 TO 13 OF THE REGULATIONS)

At a well that has been hydraulically fractured, the process of recovering fluids, or fluids mixed with solids, that were injected into the well during hydraulic fracturing is called flowback. Hydrocarbon gas associated with flowback must not be vented, but instead must be captured and either conserved or destroyed (see section 4.1 of this document), unless the flowback gas is incombustible based on its heating value.

Table 3 – Record-Keeping: Well Completion

<p>For each well, keep a record of:</p> <ol style="list-style-type: none">1. the most recent calculation of GOR before hydraulic fracturing (refer to section 4.2 of this document)2. proof that the flowback gas was conserved or destroyed (only if GOR was $\geq 53:1$)3. the heating value of the flowback gas (only if the flowback gas was vented)

NOTE: All records required under the Regulations must be made (and subsequently updated as necessary) within 30 days of the information to be recorded becoming available. Records must be kept for at least five years (and indefinitely if the information continues to be applicable). The records and documents must be kept at the facility to which they relate or at another location in Canada where they may be readily inspected. Records or document must be provided either immediately during facility inspections or within 60 days of a request by Environment and Climate Change Canada.

3.2. COMPRESSOR REQUIREMENTS (SECTIONS 14 TO 19 OF THE REGULATIONS)

For compressors that have a rated brake power of at least 75 kW, the emissions from the seal vents of centrifugal natural gas compressors or the emissions from the rod packing and distance piece vents of reciprocating compressors must be either:

- captured and conserved or destroyed (see section 4.1 of this document)
- vented to atmosphere at a flow rate equal to or less than the limit applicable to the compressor (presented in the table below)

Table 4 – Emission Limits per Compressor Type

Compressor Type	Installation Date	Rated Brake Power	Hydrocarbon Gas Vent Limit (m ³ per minute)
Centrifugal (limits are per compressor)	On or after January 1, 2023	≥ 75 kW	0.14
	Before January 1, 2023	≥ 75 kW and < 5 MW	0.34
		≥ 5 MW	0.68
Reciprocating (limits are per throw/cylinder)	On or after January 1, 2023	≥ 75 kW	0.001
	Before January 1, 2023	≥ 75 kW	0.023

Note that the limits are based on installation date (either before or on/after January 1, 2023). This means that, if an existing compressor is installed at a new location after January 1, 2023, the lower limit is applicable to that compressor from that installation date.

Flow Rate Measurements Procedure

Flow rate measurements must be made:

- annually using either a flow meter that is not a calibrated bag or continuously using a continuous monitoring device equipped with an alarm that is triggered when the flow rate reaches the applicable limit in the table above
- using a flow meter or continuous monitoring device with an accuracy of at most ±10% that is calibrated according to its manufacturer’s recommendations
- with a tight seal over the vent unless a flow meter that uses negative pressure or a vacuum is used
- following any recommendations in the manufacturer’s manual
- for a duration between 5 and 15 minutes where the maximum flow rate measured is the result or 15 minutes or longer where the average of the flow rates measured is the result
- continuously other than during normal servicing or during repairs (only if a continuous monitoring device is used)
- while the compressor is operating and under conditions that are representative of the last 7 days (only if measuring the vent of a centrifugal compressor)
- while the compressor is either operating or pressurized (only if measuring the vent of a reciprocating compressor)

Annual measurements may be taken using a continuous monitoring device that is equipped with a display. If this is done, the continuous monitoring device does not need to be equipped with an alarm.

Frequency of Flow Rate Measurements

The first annual flow rate measurement must be taken during the 2020 calendar year if the compressor was installed before January 1, 2020 and during the first year of its operation if the compressor was installed on or after January 1, 2020. All subsequent annual measurements must be taken within 365 days of the previous measurement. If the centrifugal compressor is not in operation or the reciprocating compressor is not pressurized when an annual measurement becomes due, the measurement can be taken in the first 30 days of it being under proper testing conditions.

If the compressor has been pressurized for less than 5% of the time in the last 3 years (< 1,314 hours), an annual measurement is not required.

Corrective Actions Following Flow Rate Measurements

If the **annually-measured** flow rate is above the applicable limit or the continuous monitoring device's alarm is triggered, corrective action must be taken to reduce the flow rate to below that limit. Successful corrective action must be demonstrated by either a re-measurement or lack of an alarm within 90 days. In the case where taking corrective action will emit more than the compressor vent itself will before the next planned shutdown, corrective action can be postponed until the next planned shutdown.

Table 5 – Record-Keeping: Compressor

<p>For each compressor, keep a record of:</p> <ol style="list-style-type: none">1. serial number, make, and model2. rated brake power3. proof of installation date or proof that it was installed before January 1, 20204. type of conservation or destruction equipment installed (see section 3.1 of this document)5. an indication of wet or dry seals (only for centrifugal compressors)6. number of cylinders (only for reciprocating compressors)7. number of hours of pressurization during the previous 3 years (only if measurement was not taken)
<p>For each annual flow rate measurement, keep a record of:</p> <ol style="list-style-type: none">1. make and model of the flow meter used2. flow rate result3. date measured4. proof of calibration according to the manufacturer's recommendations and that the measurement taken with that calibration have a maximum margin of error of $\pm 10\%$.5. manufacturer manual with measurement recommendation, if any6. duration of measurement7. name of company and individual who took the measurement
<p>For each continuous monitoring device, keep a record of:</p> <ol style="list-style-type: none">1. description of the device2. serial number, make, and model3. proof of calibration according to the manufacturer's recommendations and that the measurement taken with that calibration have a maximum margin of error of $\pm 10\%$.

For each corrective action taken, keep a record of:

1. description of corrective action
2. date completed, along with the dates each step was taken
3. estimation showing that corrective action will emit more than compressor vent (only if corrective action was postponed)
4. date on which alarm was triggered (only if a continuous monitoring device was used)

NOTE: All records required under the Regulations must be made (and subsequently updated as necessary) within 30 days of the information to be recorded becoming available. Records must be kept for at least five years (and indefinitely if the information continues to be applicable). The records and documents must be kept at the facility to which they relate or at another location in Canada where they may be readily inspected. Records or document must be provided either immediately during facility inspections or within 60 days of a request by Environment and Climate Change Canada.

3.3. VENTING REQUIREMENTS (SECTIONS 26 TO 27 OF THE REGULATIONS)

An upstream oil and gas facility must not vent more than 15,000 m³ of hydrocarbon gas during the year if it meets both of the following criteria:

- it has produced and/or received a total combined volume of at least 60,000 m³ of hydrocarbon gas in the previous year, and
- as of a given month, its combined vented, destroyed (not including combustion for a useful purpose such as creating energy or heat), and delivered hydrocarbon gas volume was at least 40,000 m³ in the previous 12 consecutive months

It should be noted that not meeting the second criterion above indicates that most of the hydrocarbon gas present at the facility is used as fuel gas to carry out the operation at the facility.

See section 4.2 of this document for volume calculation methods. For facilities that have been in operation for less than a year, the thresholds are pro-rated, as described in section 2.3 of this document.

Vented gases subject to these provisions:

- are routine, occurring in a controlled manner (i.e. not a leak)
- exclude emissions arising from combustion (i.e. not from exhaust)

These vented gases include but are not limited to venting from tanks, separators, and wellheads.

The volumes of hydrocarbon gases vented that arose from the following sources are excluded from the determination of volume vented under the Regulations:

- liquids unloading (the removal of accumulated liquids from a gas well)
- blowdowns (depressurization of equipment or pipelines)
- glycol dehydration (use of liquid desiccant to remove water)
- pneumatic devices (covered elsewhere in the Regulations)
- compressors (covered elsewhere in the Regulations)

- start-up and shutdown of equipment
- well completions (covered elsewhere in the Regulations)
- emergency venting

Table 6 – Record-Keeping: Venting

<p>For each month, keep a record of:</p> <ol style="list-style-type: none"> 1. volume (in m³) of hydrocarbon gas vented 2. volume (in m³) of hydrocarbon gas vented from excluded sources 3. volume (in m³) of hydrocarbon gas destroyed 4. volume (in m³) of hydrocarbon gas delivered
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NOTE: All records required under the Regulations must be made (and subsequently updated as necessary) within 30 days of the information to be recorded becoming available. Records must be kept for at least five years (and indefinitely if the information continues to be applicable). The records and documents must be kept at the facility to which they relate or at another location in Canada where they may be readily inspected. Records or document must be provided either immediately during facility inspections or within 60 days of a request by Environment and Climate Change Canada.

3.4. LEAK DETECTION REQUIREMENTS (SECTIONS 28 TO 36 OF THE REGULATIONS)

An upstream oil and gas facility that has produced and/or received a total of at least 60,000 m³ of hydrocarbon gas must have and follow a leak detection and repair program. For details about facilities that have been in operation for less than a year, the thresholds are prorated as described in section 2.3 of this document.

The leak detection and repair program must ensure that equipment components (defined as a component that comes in contact with hydrocarbons and has the potential to emit unintentional fugitive emissions of hydrocarbon gas) are inspected at least three times per year and at least 60 days after the previous inspection. Inspections must be completed using an eligible leak detection instrument (described further below) that is operated and maintained according to its manufacturer’s recommendations. It is expected that the entire facility undergo leak detection surveys whenever any of the sites that are a part of the facility is surveyed. For example, if a well site forms a facility along with a multi-well battery, each time the multi-well battery is surveyed, the co-located well site would also be surveyed.

The first inspection must be on or before May 1, 2020 or within 60 days of when the facility begins to operate. All inspections must be performed by an individual who has received training in the last 5 years on the operation and calibration of the instrument used.

Equipment components do not need to be inspected if they are located at the following:

- on a wellhead at a site comprised of a single wellhead, metering devices, and gathering pipelines, but no other associated equipment (i.e. no other components that come in contact with hydrocarbon gas and have the potential to emit)
- along a portion of transmission pipeline between two isolation valves that contains no other associated equipment
- in a location where inspection would pose a serious risk to human health or safety

Leak Detection Device

The following are eligible leak detection devices:

- a portable monitoring instrument that meets the specifications of, is operated and calibrated according to, and undergoes a calibration drift assessment after each day of use as described in resource 1 in Annex A of this document
- an optical gas-imaging instrument capable of imaging hydrocarbon gas that has a concentration of 250 ppmv of methane and 250 ppmv of propane, or gas that has a flow rate of at least 60 grams per hour leaking from an orifice that is 0.635 centimeters in diameter, from a viewing distance described in resource 2 of Annex A of this document

To determine that an optical gas-imaging instrument is capable of measuring the hydrocarbon gas, the component with the highest concentration in the hydrocarbon gas being detected must be within the spectral range of the camera.

The optical gas-imaging instrument must be operated according to resource 2 of Annex A of this document. Because the **viewing distance** may change with varying ambient conditions, for each detection performed, the viewing distance must be determined in accordance with resource 2 of Annex A.

Repairs Following Leak Detection

If a leak of 500 ppmv (parts per million by volume) or more is measured or any leak is detected using non-measurement methods during an inspection, it must be repaired either within 30 days while the equipment is running or during the next planned shutdown. The next planned shutdown must occur before all leaking equipment components combined would emit more than taking corrective action would emit based on an estimation (refer to example below). While no methodologies for this estimation are specified, documentation detailing the estimation should be kept on record for inspection.

For example:

- Two leaks of 0.2 m³/hour each are detected and the next planned shutdown in 120 days from now
- Equipment blowdown is required to repair the leaks (blowdown volume is 425 m³)
- Calculation of days until mandatory shutdown:

$$\text{Days} = \frac{\text{volume emitted due to repair}}{\text{daily volume emitted by leaks}}$$

$$\text{Days} = \frac{425 \text{ m}^3}{0.4 \text{ m}^3/\text{hr} * 24 \text{ hr}/\text{day}}$$

$$\text{Days} = 44 \text{ days until mandatory shutdown}$$

A repair is considered successful if the hydrocarbon concentration of the leak is determined to be less than 500 ppmv using an eligible portable monitoring instrument. If a leak is detected using non-measurement methods and the hydrocarbon concentration of the leak is determined to be less than 500 ppmv using an eligible portable monitoring instrument, it does not need to be repaired.

Repair Extensions

At least 45 days before the repair is due, an operator can apply to extend the repair period up to 6 months. An operator can apply by using the template available on the Federal Methane Regulations webpage in the CEPA Registry titled *Information for Extension of Period for Repair of Equipment Component* and providing the following information in their application:

- name and address of the operator
- name, title, address, telephone number and email address of the authorized official (individual or officer who can act on behalf of the operator) and a contact person
- name of facility
- facility's federal and provincial identification numbers
- location of the facility (address, latitude and longitude, National Topographic System location, or legal subdivision)
- date of next planned shutdown
- identifier, make, model, manufacturer, manufacturing location, and description of function of equipment component that cannot be repaired
- documents that establish that it is not technically feasible to complete the repair before the end of the next planned shutdown
- documents that establish a plan to repair that sets out the expected date for the completion of the repair, steps to be taken to ensure completion of the repair by that date, a justification, with supporting documents, for the date being the earliest feasible date to complete the repair, and measures that will be taken to minimize or eliminate any harmful effect on the environment or human health from the emissions until completion of the repair
- a statement that the implementation of the plan is to begin within 30 days of the extension being granted

These applications will be assessed based on the information and documents provided. The extensions for up to 6 months begins on the day the repair was due. The application may include several equipment components. The period granted may be further extended by up to 6 month by a second and final application under the same condition. At most, a total of two applications for extensions may be made for a particular leak. It is important to have a way to identify a particular leak respecting an equipment component and include this in the application. An application will be refused and may be revoked if there are reasonable grounds to believe that the applicant has provided false or misleading information in the application.

Alternative Leak Detection and Repair Programs

Alternatives to the above-outlined leak detection and repair program may be used if the same emission reductions can be achieved. An alternative program may include adjustments to the regulatory leak detection and repair program that are substantial such as the introduction of new and innovative technologies, or minimal such as incorporating another method to either identify emissions or confirm repair or use of another tool not listed in the reference materials. In order to follow an alternative leak detection and repair program, the operator must:

- create an alternative leak detection and repair program that includes:
 - inspections for leaks
 - an outline of operation, maintenance, and calibration of any leak detection instruments used
 - the repair of detected leaks
- notify the Minister that an alternative leak detection and repair program is being used
- demonstrate both before the program begins and annually (at least 90 days after a previous demonstration), in a record, that the alternative program results in the same quantity of fugitive emissions as the Regulations-specified leak detection and repair program

An operator can notify the Minister by using the template available on the Federal Methane Regulations webpage in the CEPA Registry titled the *Alternative LDAR Notification Form*. There is no approval process for the alternative leak detection and repair program. An operator must make the demonstration and keep all supporting documentation on record. In order to demonstrate that an alternative leak detection and repair program results in the same quantity of fugitive emission reductions as the regulatory program, the operator must:

- estimate the emissions reductions obtained by the two programs at the facility in question
- specify the accuracy of all devices and equipment used for the purpose of the alternative leak detection and repair program, including an explanation of the effect that these accuracies and the frequency of inspections have on the effectiveness of the alternative leak detection and repair program
- provide support for any assumptions made (for example, studies that show the effectiveness of technologies or methodologies may be used to make the comparison and provide adequate justification)

Note that the mere absence of leaks for a period of time is not an acceptable demonstration that the leak detections and repair program can be made less stringent or carried out less frequently under an alternative leak detection and repair application. It is expected that most of the time no or few leaks will be found. The leak detection and repair program must be carried out on a continued basis in order to identify the rare, but often substantial, leaks that may occur.

Table 7 – Record-Keeping: Regulatory and Alternative Leak Detection and Repair

<p>For each non-application from the LDAR requirements, keep a record of:</p> <ol style="list-style-type: none"> 1. the equipment component and why it does not need to be inspected
<p>For each calibration of a leak detection instrument, keep a record of:</p> <ol style="list-style-type: none"> 1. date of calibration 2. result of each calibration drift assessment 3. name, title, and address of the individual who did the calibration

For each inspection of a component, keep a record of:

1. date of inspection
2. name of the individual who conducted the inspection
3. type of component
4. location of component within the facility or GPS location (to five decimal places)
5. type of leak detection instrument used to conduct the inspection, including its make and model (and description of the operation, maintenance and calibration measures along with maintenances and calibrations dates and names of persons who carried out these activities when an Alternative LDAR is used)
6. images recorded, along with embedded time and date, and the location in the facility they were recorded (only if optical gas-imaging was used)
7. method of detection for each leak detected
8. date of measurement, name of the individual (and, if applicable, their corporation) who did the measurement, result of the measurement in ppmv, and make and model of the measurement instrument used for any leak detected by a non-measurement method that was later measured to be less than 500 ppmv

For each leak detected by a non-measurement method, but not during an inspection, keep a record of:

1. whether the method of detection was auditory, olfactory, or visual
2. date of detection
3. individual who detected it
4. type of component
5. location of component within the facility or GPS location (to five decimal places)
6. date of measurement, name of the individual who did the measurement, result of the measurement in ppmv, and make and model of the measurement instrument used for any leak later measured to be less than 500 ppmv

For each individual who received training on an instrument and conducted an inspection, keep a record of:

1. name, name and address of employer (if not the operator)
2. name and address of entity that gave the training
3. name and job title of individuals who provided training
4. date of training
5. number of hours of training
6. description of the training

For each leak repair, keep a record of:

1. description of the steps taken to repair the leak and the date that each of the steps was taken
2. the result in ppmv of the measurement that confirmed the leak was repaired (along with a description of the means by which that inspection was conducted when an Alternative LDAR is used)
3. date that the measurement was taken

For each repair not completed within 30 days of leak detection, keep a record of:

1. reason why the component could not be repaired while in operation
2. latest date allowed for the next planned shutdown, if applicable, along with information and calculations on which that date was determined

For each instrument used to detect and measure leaks, keep a record of:

1. manufacturer's operation and maintenance recommendations

*For any alternative leak detection and repair program followed, the alternative program results in at most the same quantity of fugitive emissions as would the regulatory program as demonstrated in a record with supporting documents before the program is established and at least once a year (at least 90 days after a previous demonstration) while the program is carried out.

NOTE: All records required under the Regulations must be made (and subsequently updated as necessary) within 30 days of the information to be recorded becoming available. Records must be kept for at least five years (and indefinitely if the information continues to be applicable). The records and documents must be kept at the facility to which they relate or at another location in Canada where they may be readily inspected. Records or document must be provided either immediately during facility inspections or within 60 days of a request by Environment and Climate Change Canada.

3.5. PNEUMATIC CONTROLLER REQUIREMENTS (SECTIONS 37, 38 AND 41 OF REGULATIONS)

A pneumatic controller must not operate at a continuous bleed rate that is higher than 0.17 m³ per hour if it operates using a hydrocarbon gas other than propane.

If the controller operates at a continuous bleed rate higher than 0.17 m³ per hour:

- the emissions must be captured and either conserved or destroyed (see section 4.1 of this document), or
- the operator must demonstrate that the controller must operate at a higher bleed rate in order to have sufficient response time to control a process related to the facility's production activities and flag the controller as not subject to the bleed rate limit, either by electronically or physically tagging it (the tag must include its identifier)

Table 8 – Record-Keeping: Pneumatic Controller

For each pneumatic controller that operates using hydrocarbon gas, keep a record of:

1. identifier
2. controller purpose (pressure, flow rate, liquid level, temperature, etc.)
3. expected continuous bleed rate while it operates at current operational settings according to the manufacturer, including its supply pressure and, if any, its band setting, or its bleed rate according to a written demonstration, with supporting documents, made by the operator for the facility at which the controller is used.

NOTE: All records required under the Regulations must be made (and subsequently updated as necessary) within 30 days of the information to be recorded becoming available. Records must be kept for at least five years (and indefinitely if the information continues to be applicable). The records and documents must be kept at the facility to which they relate or at another location in Canada where they may be readily inspected. Records or document must be provided either immediately during facility inspections or within 60 days of a request by Environment and Climate Change Canada.

3.6. PNEUMATIC PUMP REQUIREMENTS (SECTIONS 39 TO 41 OF THE REGULATIONS)

The pneumatic pumps that inject methanol into a common stream at a facility must not operate using hydrocarbon gas, if together they pump more than 20 liters of methanol per day, based on the monthly average. Alternatively, hydrocarbon gas may be used, but any gas emitted must be captured and either conserved or destroyed (see section 4.1 of this document).

By June 30, 2022, an operator can apply for a permit, by using the template available on the Federal Methane Regulations webpage in the CEPA Registry titled *Information for Permit for Pneumatic Pumps*, to allow the use of hydrocarbon gas in pneumatic pumps at a facility, without the need to capture the gas emitted if the following conditions are met:

- it is not technically or economically feasible to have the pneumatic pump operate at the facility without using hydrocarbon gas or to have the pneumatic pump function using hydrocarbon gas while its hydrocarbon emissions are captured and routed to hydrocarbon gas conservation or destruction equipment, and
- the operator has a plan regarded as feasible (including a plan schedule) to meet the requirements by January 1, 2026, and to minimize the emissions of hydrocarbon gas from the pumps, by adjusting the capacity of the pump or the operational settings to achieve the injection rate with the least possible emissions until the requirements are met

The permits expire on December 31, 2025, at which time no further permits will be granted. The following information is required to obtain a permit:

- name and address of the operator
- name, title, address, telephone number and email address of the authorized official (individual or officer who can act on behalf of the operator) and a contact person
- name of facility
- facility's federal and provincial identification numbers
- location of the facility (address, latitude and longitude, National Topographic System location, or legal subdivision)
- identifier, make, model, and manufacturer of the pneumatic pump
- documents that establish that it is not feasible (technically or economically) for the applicant to meet the requirements

Any pneumatic pump for which the operator has been granted a permit must be flagged as not subject to the requirements, either by electronically or physically tagging it (where the tag includes its identifier).

Table 9 – Record-Keeping: Pneumatic Pump

For each pump or group of pneumatic pumps at a facility, keep a record of:

1. quantity of liquid pumped each month, if together they pumped > 20 L/day on average
2. proof that > 20 L/day on average could not have been pumped

NOTE: All records required under the Regulations must be made (and subsequently updated as necessary) within 30 days of the information to be recorded becoming available. Records must be kept for at least five years (and indefinitely if the information continues to be applicable). The records and documents must be kept at the facility to which they relate or at another location in Canada where they may be readily inspected. Records or document must be provided either immediately during facility inspections or within 60 days of a request by Environment and Climate Change Canada.

3.7. OTHER EQUIPMENT REQUIREMENTS (SECTIONS 42 TO 44 OF THE REGULATIONS)

Except when they need to be open for operational purposes, open-ended pipes and hatches must be closed to minimize hydrocarbon gas emissions. Sampling systems and pressure relief devices must be installed and operated in a way that minimized hydrocarbon gas emissions. If a valve opens occasionally for safety purposes, it must not be left open after the safety event is over.

Table 10 – Record-Keeping: Other Equipment

<p>For each facility, keep a record of:</p> <ol style="list-style-type: none">1. list of open-ended pipes, hatches, sampling systems, and pressure relief devices at the facility

NOTE: All records required under the Regulations must be made (and subsequently updated as necessary) within 30 days of the information to be recorded becoming available. Records must be kept for at least five years (and indefinitely if the information continues to be applicable). The records and documents must be kept at the facility to which they relate or at another location in Canada where they may be readily inspected. Records or document must be provided either immediately during facility inspections or within 60 days of a request by Environment and Climate Change Canada.

3.8. OFFSHORE FACILITY VENTING REQUIREMENTS (SECTIONS 47 TO 48 OF THE REGULATIONS)

An offshore facility must not vent more than 15,000 m³ of hydrocarbon gas during a year. This does not include required emergency venting.

Table 11 – Record-Keeping: Offshore Venting

<p>For each year, keep a record of:</p> <ol style="list-style-type: none">1. volume (in m³) of hydrocarbon gas vented
<p>Each time hydrocarbon gas is vented during an emergency, keep a record of:</p> <ol style="list-style-type: none">1. facility name2. volume (in m³) vented during the emergency3. description of the emergency situation

NOTE: All records required under the Regulations must be made (and subsequently updated as necessary) within 30 days of the information to be recorded becoming available. Records must be kept for at least five years (and indefinitely if the information continues to be applicable). The records and documents must be kept at the facility to which they relate or at another location in Canada where they may be readily inspected. Records or document must be provided either immediately during facility inspections or within 60 days of a request by Environment and Climate Change Canada.

3.9. OFFSHORE FACILITY COMPRESSOR REQUIREMENTS (SECTIONS 49 TO 51 OF THE REGULATIONS)

For centrifugal compressors located at offshore facilities, the emissions from the seal vents must be either:

- captured and conserved or destroyed (see section 4.1 of this document)
- emitted at a flow rate equal to or less than the applicable limit presented in the table below

Table 12 – Emission Limits per Compressor Type for Offshore Oil and Gas

Compressor Type	Installation Date	Rated Brake Power	Limit per Compressor Cylinder (m ³ per minute)
Centrifugal	On or after January 1, 2023	Any	0.14
	Before January 1, 2023	< 5 MW	0.34
		≥ 5 MW	0.68

The flow rate of the vent must be measured using a continuous monitoring device:

- with an accuracy of at most ±10% that is calibrated according to its manufacturer recommendations
- equipped with an alarm that is triggered when the flow rate reaches the applicable limit in the table above
- operated continuously (other than normal service or during repairs)

If the continuous monitoring device’s alarm is triggered, corrective action must be taken to reduce the flow rate to below the applicable limit, demonstrated by lack of an alarm.

Table 13 – Record-Keeping: Offshore Compressors

<p>For each centrifugal compressor, keep a record of:</p> <ol style="list-style-type: none"> 1. serial number 2. make and model 3. whether it was installed before or on or after January 1, 2023 4. rated brake power (only if it was installed before January 1, 2023) 5. proof of calibration according the manufacturer’s recommendations for the continuous monitoring device installed and that the measurement taken with that calibration have a maximum margin of error of ±10%.
<p>For each triggered alarm, keep a record of:</p> <ol style="list-style-type: none"> 1. serial number, make, and model of the continuous monitoring device 2. date of alarm 3. flow rate indicated by continuous monitoring device when the alarm triggered 4. description of correct action taken, along with the dates on which action was taken

NOTE: All records required under the Regulations must be made (and subsequently updated as necessary) within 30 days of the information to be recorded becoming available. Records must be kept for at least five years (and indefinitely if the information continues to be applicable). The records and documents must be kept at the facility to which they relate or at another location in Canada where they may be readily inspected. Records or document must be provided either immediately during facility inspections or within 60 days of a request by Environment and Climate Change Canada.

3.10. OFFSHORE LEAK DETECTION REQUIREMENTS (SECTIONS 52 TO 53 OF THE REGULATIONS)

An offshore upstream oil and gas facility must be equipped with a gas detection system as described in resources 3 or 4 in Annex A of this document. Leaks detected by either the gas detection system or other methods (including dripping of hydrocarbon liquids) must be repaired within 730 days.

Table 14 – Record-Keeping: Offshore Leak Detection

For each leak, keep a record of:

1. date of detection
2. type of equipment that was leaking
3. location or identifier of equipment component
4. method of detection
5. steps that were taken to repair the leak and the dates that each step was taken

NOTE: All records required under the Regulations must be made (and subsequently updated as necessary) within 30 days of the information to be recorded becoming available. Records must be kept for at least five years (and indefinitely if the information continues to be applicable). The records and documents must be kept at the facility to which they relate or at another location in Canada where they may be readily inspected. Records or document must be provided either immediately during facility inspections or within 60 days of a request by Environment and Climate Change Canada.

4. GENERAL PROTOCOLS

4.1. GAS CONSERVATION AND DESTRUCTION REQUIREMENTS (SECTIONS 5 TO 10 OF THE REGULATIONS)

In order to conserve or destroy hydrocarbon gas, the emissions must be routed to conservation or destruction equipment. Conserved gas is hydrocarbon gas that has been either:

- used as fuel in a combustion device (i.e. used to produce heat or energy) where 5% or less of the gas is emitted to the atmosphere
- delivered (meaning transported from the facility), or
- injected underground for a purpose other than disposal

Destroyed gas is hydrocarbon gas that has been converted to carbon dioxide in a manner that has not made use of the thermal or mechanical energy of the gas. Flaring and incineration are both examples of gas destruction.

Conservation equipment must capture and conserve at least 95% of the gas (by volume) that is routed to it, be operated continuously (other than during normal servicing and repairs), and be operated and maintained according to the manufacturer's recommendations. If the manufacturer's recommendations are not followed, records that demonstrate that 95% of the gas is being conserved must be kept.

Destruction equipment must meet the flaring guidelines described in resources 5, 6, or 7 of Annex A of this document.

Table 15 – Record-Keeping: Gas Conservation and Destruction

<p>For each piece of conservation equipment used, keep a record of:</p> <ol style="list-style-type: none">1. percentage of gas captured and conserved for each month of operation, with a calculation of the volumetric flow rates on which percentage is based2. how the equipment is operated and maintained3. manufacturer's operation and maintenance recommendations4. proof that 95% of the gas is being conserved in the case where the manufacturer's recommendations for operation and maintenance are not followed
<p>If the conserved gas has been used as fuel, keep a record of:</p> <ol style="list-style-type: none">1. percentage of gas emitted to the atmosphere for each month of operation2. tests or measurements supporting the percent emitted
<p>For each piece of destruction equipment used, keep a record of:</p> <ol style="list-style-type: none">1. proof that the equipment meets the flaring guidelines described in resources 5, 6, or 7 of Annex A

NOTE: All records required under the Regulations must be made (and subsequently updated as necessary) within 30 days of the information to be recorded becoming available. Records must be kept for at least five years (and indefinitely if the information continues to be applicable). The records and documents must be kept at the facility to which they relate or at another location in Canada where they may be readily inspected. Records or document must be provided either immediately during facility inspections or within 60 days of a request by Environment and Climate Change Canada.

4.2. VOLUME OF GAS CALCULATION REQUIREMENTS (SECTIONS 23 TO 25 OF THE REGULATIONS)

The volume of hydrocarbon gas produced, received, vented, destroyed or delivered must be determined by following:

- resource 8 in Annex A of this document, if the facility is located in British Columbia
- resource 9 in Annex A of this document, if the facility is located in Manitoba or Saskatchewan
- resource 10 in Annex A of this document, if the facility is located in any other province or territory

The federal Regulations have been designed to align with requirements involving calculations set out under provincial guidelines or directives in order to simplify the administrative burden and regulatory regime. The portions of the provincial guidelines or directives that are referred to in the Regulations are related to specific calculation methods that must be followed to ensure a minimum level of rigor and consistency.

The gas production per facility per day must be measured and not estimated. However, if the expected gas production at a heavy oil facility (920 kg/m³ or greater) is equal to or less than 2,000 m³ per day the gas production may be estimated based on the GOR. The GOR is the ratio of the volume of hydrocarbon gas produced to the volume of the hydrocarbon liquid produced by a well.

The GOR must be the average volume of gas produced divided by the average volume of oil produced, where both are measured during conditions representative of the most recent month of production.

$$GOR = \frac{\left\{ \frac{\sum_{i=m}^n \text{volume of gas}_i}{n} \right\}}{\left\{ \frac{\sum_{i=m}^n \text{volume of oil}_i}{n} \right\}}$$

Where:

- i: Index of summation
- m: Lower bound of summation
- n: Upper bound of summation

The GOR must be calculated:

- annually and at least 90 days apart, if the expected or most recently determined flow rate of gas is less than 500 m³ per day
- every 6 months and at least 45 days apart, if the expected or most recently determined flow rate of gas is between 500 m³ and 1000 m³ per day
- monthly and at least 7 days apart, if the expected flow rate of gas is more than 1000 m³ per day

The measurement of volume of gas must be taken using a continuous measurement device that meets the requirements in resources 8, 9, or 10 in Annex A of this document or a flow meter taking a reading at least every 20 minutes. Measurement duration must be over a continuous 72-hour period. The measurement period may be shortened to duration of 24 hours, if the flow rate of gas from the well:

- is greater than 100 m³ per day, and
- varies by less than ±5% (compared to the average 24-hour flow rate if using continuous measurement and 95% of all readings falling within ±5% of the average flow rate if using readings from a flow meter)

The measurement of volume of oil must be taken after the water has been separated from the liquid produced and over a period of 10 days (including the period used to calculate volume of gas) using a continuous measurement device with an accuracy of ±1 m³, ensuring that the volume varies by less than ±5%. This measurement period may be shortened to the same duration as for volume of gas, if a continuous measuring device with an accuracy of ±0.1 m³ is used.

Alternatively, the GOR may be determined by the following equation:

$$GOR = -0.5P_w + 150$$

where:

P_w is the average volume (m³) of oil produced per day in the most recent month of production

Measurements are only valid if there have been no changes to production parameters of the well for at least 48 hours prior to the measurement.

Table 16 – Record-Keeping: Volumes Calculation

For each calculation, keep a record of:

1. all flow readings from the continuous measuring device or flow meter
2. flow rate over the period during measurement for any volume of gas or liquids measured
3. date, time, and duration of each measurement
4. production parameters during each measurement and for the 48 hours prior to the measurement
5. make and model of the continuous measuring device or flow meter

NOTE: All records required under the Regulations must be made (and subsequently updated as necessary) within 30 days of the information to be recorded becoming available. Records must be kept for at least five years (and indefinitely if the information continues to be applicable). The records and documents must be kept at the facility to which they relate or at another location in Canada where they may be readily inspected. Records or document must be provided either immediately during facility inspections or within 60 days of a request by Environment and Climate Change Canada.

5. REGISTRATION AND RECORD-KEEPING REQUIREMENTS

5.1. FACILITY REGISTRATION REQUIREMENTS (SECTIONS 54 AND 55 OF THE REGULATIONS)

Any upstream oil and gas facility that any of the regulatory requirements apply to must be registered by April 30, 2020 (120 days after the Regulations take effect) or, if the requirements do not apply to a facility immediately, within 120 days of when the requirements begin to apply. If any information included in the registration changes, it must be updated within 90 days. A company may register all of its facilities at once. Only facilities subject to one or more requirements in the Regulations need to register.

Registration includes the following information:

- name and address of operator
- name, title, address, telephone number and email address of the authorized official (individual or officer who can act on behalf of the operator) and a contact person
- name of facility
- facility's federal and provincial identification numbers
- location of the facility (address, latitude and longitude, National Topographic System location, or legal subdivision)
- location where records are kept if not at the facility (address, latitude and longitude, National Topographic System location, or legal subdivision)
- an indication of any facility type or subtype that is used by the approved entity, if the facility is registered with another entity

An operator can register their facilities by using the template available on the Federal Methane Regulations webpage in the CEPA Registry titled *Information for Registration of a Facility*.

5.2. RECORD-KEEPING REQUIREMENTS (SECTION 56 OF THE REGULATIONS)

All records required for the purposes of the Regulations must be made within 30 days of the information becoming available and must be kept indefinitely for records that apply on an ongoing basis, such as makes and models of equipment, or for at least 5 years in any other case. The records (and the documents that support them) must be kept either at the facility or at another location in Canada where it is possible to inspect them.

Upon request, the operator must provide a hard copy of any of the records or supporting documents requested. The operator may provide records in electronic format where the Minister allows, but the Minister may also request a hard copy of any records provided previously in an electronic format.

5.3. FEDERAL ENFORCEMENT AND PENALTY MEASURES

As indicated in the [Canadian Environmental Protection Act \(CEPA\) Compliance and Enforcement Policy](#), there are a range of responses to alleged violations.

With respect to the federal methane regulations, these measures include the following:

- Warnings, for a suspected violation, so that the offender can take notice and return to compliance
- Directions that may be issued to deal with or prevent illegal releases of regulated substances
- Ministerial Orders
- Environmental Protection Compliance Orders, to put an immediate stop to illegal activity, to prevent a violation from occurring or to require action to be taken
- Environmental protection alternative measures agreement, as an alternative to prosecution, to come to agreement on measures that the accused must take in order to restore compliance
- Prosecution by a Crown prosecutor; and
- Penalties and court orders upon conviction.

While the facts of each situation will be different in relation to alleged violations of CEPA, an important consideration in determining an enforcement response is the effectiveness of the response in securing compliance as quickly as possible with no recurrence of violation. An enforcement officer may give consideration to an enforcement response with an objective of quick resolution of non compliance, including warnings, directions, orders.

ANNEX A

Resources

1. Section 60.485a(b)(2) of Subpart VVa, entitled *Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for which Construction, Reconstruction, or Modification Commenced After November 7, 2006*, in Part 60 of Title 40, Chapter I of the *Code of Federal Regulations* of the United States
2. Alternative work practice of the Environmental Protection Agency of the United States set out in Sections 60.18(h)(7)(i)(2)(i) to (v) of Section 60.18, entitled *General control device and work practice requirements*, in Part 60 of Title 40, Chapter I of the *Code of Federal Regulations* of the United States
3. Section 32 of the *Newfoundland Offshore Petroleum Installations Regulations*
4. Section 32 of the *Nova Scotia Offshore Petroleum Installations Regulations*
5. Sections 3.6 and 7 of Version 4.5 of the guideline entitled *Flaring and Venting Reduction Guideline*, published by the Oil and Gas Commission of British Columbia
6. Section 3 of the directive entitled *Directive S-20: Saskatchewan Upstream Flaring and Incineration Requirements*, published by the Government of Saskatchewan
7. Sections 3.6 and 7 of the directive entitled *Directive 060: Upstream Petroleum Industry Flaring, Incinerating, and Venting*, published by the Alberta Energy Regulator
8. *Measurement Guideline for Upstream Oil and Gas Operations*, published by the Oil and Gas Commission of British Columbia
9. *Measurement Requirements for Oil and Gas Operations* and commonly referred to as Directive PNG017, published by the Government of Saskatchewan
10. *Measurement Requirements for Oil and Gas Operations* and commonly referred to as AER Directive 017, published by the Alberta Energy Regulator