CAPE
Canadian Association of Physicians for the Environment
Association Canadienne des Médecins pour l'Environnement
ACME

May 27, 2018

To: **Alberta Energy Regulator, Climate Policy Assurance Branch**
Suite 1000, 250 – 5 Street SW, Calgary, Alberta T2P 0R4
Methane.Reduction@aer.ca

Re: **Comments on AER DRAFT Directive 060: Upstream Petroleum Industry Flaring, Incinerating, and Venting and Directive 017: Measurement Requirements for Oil and Gas Operations[1] relate, proposed April 24, 2018**

These comments are being offered on behalf of the Canadian Association of Physicians for the Environment **(CAPE)**. CAPE is a non-profit organization, directed by a Board that includes 10 physicians, with a mission to improve human health by protecting the planet.

Overall Comments

We strongly support the move to significantly reduce methane emissions from the upstream oil and gas sector in Alberta to mitigate climate change and protect human health. Climate disasters are increasingly taking a toll on human health around the world. Both physical and mental health risks have been increasing for Canadians over the last two decades as wildfires, floods, heat waves, and other extreme weather events, become more frequent and more intense.

Considering the powerful impact of methane emissions on climate, the significant contribution of the oil and gas sector to emissions, and the cost-effective actions that can be taken to reduce them in the oil and gas sector, the implementation of strong methane regulations is one of the easiest ways for Canada/Alberta to reduce greenhouse gases and meet our commitments under the Paris Agreement.

The proposed Alberta Directive 60 appears to be less stringent and less enforceable, for the most part, than the federal methane regulations, and would likely result in more emissions of methane being released from the oil and gas sector through venting and leaking.

While the lack of air emissions and air quality data make it challenging to draw direct connections between methane emissions from the upstream oil and gas sector and risks to human health, the composition of natural gas and the findings of existing research, suggest that actions taken to reduce methane emissions will reduce emissions of harmful co-pollutants and produce health benefits for workers in the industry and residents living in nearby communities.

Given the significant contribution of methane emissions from the oil and gas sector to Canada's inventory of greenhouse gas emissions, and the considerable uncertainty regarding their measurement and volume, it is essential that research be conducted to address these uncertainties, and that universal standards for measuring and reporting emissions be developed, with results being made publicly accessible.

While there are elements in Directive 60 that appear to more stringent or more detailed than those provided in the federal methane regulations, it is essential that the voluntary measures in Directives 60 and 17 not be used to undermine the mandatory requirements in the new federal methane regulations. Instead, they should build upon, enhance, and strengthen the federal requirements.

Climate Change – Public Health Challenge of the 21st Century

Climate change is the most significant public health challenge of our generation. Climate change affects many of the social and environmental factors that shape health, including air quality, air temperature, security and quality of drinking water, security of food supplies, the range of insect-borne diseases, and the security of housing and transportation systems.

The World Health Organization has declared climate change "the greatest threat to global health in the 21st century" (WHO, 2016) and estimated that it will produce 250,000 additional deaths each year by 2030 due to heat exposure, diarrhea, malaria, and under-nutrition (WHO 2014a).

Climate change is the ultimate health equity and social justice issue. Countries with poor health infrastructure and low incomes that are already struggling to feed their residents are the hardest hit by climate change, while countries with the highest standards of living, such as Canada, are among the largest emitters of the greenhouse gases that are contributing to climate change.

But Canadians will not be unaffected by climate change. Over the last two decades, Canadian have felt the impacts of climate change first-hand with floods, mudslides, droughts, ice storms, wildfires, hurricanes, tornados, and heat waves that are occurring with greater frequency and/or intensity. Canada's subarctic and arctic is seeing rapid change, leaving communities struggling with melting permafrost, unreliable ice roads, mental health impacts and decreased access to traditional foods.

These changing climate patterns and extreme weather events have been associated with deaths, injuries, mental stress, and financial duress (Health Canada, 2005; Lancet Countdown, 2017).

Methane regulations for the oil and gas sector are an essential element in Canada's plan to address climate change and meet its climate commitments under the Paris Agreement because methane emissions from the oil and gas sector are a significant source of greenhouse gas emissions in Canada. The federal government estimates that they are responsible for 15% of Canada's greenhouse gases (**GHGs**) or 108 Mt CO_2e per year (Canada, 2016).

[It should be noted that these estimates have been derived by the federal government with the assumption that methane has a global warming potential 25 times greater than carbon dioxide (**CO_2**) over a 100-year period and 70 times greater over a 20-year period (Canada Gazette, 2018). The International Panel on Climate Change (**IPCC**) estimates that methane is 86 times more powerful as a climate warming agent than CO_2 over a 20-year period and 34 times more powerful over 100 years (IPCC, 2013). So the federal estimates may well under-estimate the contribution of this source of emissions to Canada's greenhouse gas inventory.]

Introduction

On April 26, 2018 the *Canada Gazette* published ***'Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds (Upstream Oil and Gas Sector)',*** which were first released for public review/comment/objection in *Canada Gazette Part I* on May 27, 2017.

On April 24, 2018 the province of Alberta released its own Draft Requirements for Reducing Methane Emissions, a document open for public comments until May 28, 2018. Section 8 of the updated ***Draft Directive 60 'Upstream Petroleum Industry Flaring, Incinerating, and Venting'*** is where specific changes to methane management and reporting are documented. The section, entitled 'Vent Gas Limits and Fugitive Emissions Management' describes requirements to meet the Government of Alberta's target to reduce methane emissions from the provincial upstream oil and gas sector by 45% over 2014 levels by 2025.

Both Directive 60 and ***Directive 17: Measurement Requirements for Oil and Gas Operations*** relate solely to emissions from the oil and gas sector (AER, 2018b) as does Canada's newly released methane regulations.

Sources of Methane

Methane is more commonly referred to as 'natural gas' and is considered a relatively 'clean' fuel when compared to other energy sources such as coal or diesel. It has been estimated that the oil and gas sector is responsible for 41% of the Canada's methane emissions with 18.5% from fugitive emissions

and 23% from flaring or venting (CEPA, 2016). Methane may be produced by the upstream oil and gas industry as a by-product of oil production (known as 'solution gas') or as a primary extraction product.

The upstream oil and gas sector, which is the target of both Alberta and Canada's new methane policies, includes extraction (exploration, drilling, testing and production), some processing (e.g. dehydration, desulphurisation, compression), some storage, and local-level transport such as pipelines between wells and processing plants. The upstream sector does not include 'sale lines' (i.e. those carrying processed gas or oil to market) or refineries and marketing.

In the process of exploring, producing and developing natural gas resources, some may be vented directly to the atmosphere. Sources of venting include wellhead casings, processing equipment, and storage tanks (Gazette, 2018). In addition, routine venting may include gas from production casing vents, process vents, tank vents, blanketing, online gas analyzer purge vents, batteries, compressor seals, pneumatic devices, glycol dehydrator vents, desiccant dehydrator regeneration vents and membrane dehydrator purge vents. Venting usually occurs purposefully, generally to relieve pressure, test or complete wells, or during repairs and workover but emergency/unplanned venting can also occur in case of emergency or facility upset. Table 4 of Directive 60 provides vent gas (methane) limits for a variety of upstream oil and gas sources, as well as reporting/survey requirements for fugitive emissions (AER, 2018a).

In contrast to venting emissions, fugitive emissions of methane are "unintended emissions from facilities or activities (e.g., construction) that could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening…" (CEPA, 2016). Fugitive emissions of methane originate from valves, seals and connectors associated with pipelines, wells, and gas processing equipment; as well as from various types of hydrocarbon and produced water storage tanks (CAPP 2014), gas plants, injection and disposal sites, and compressor stations (AER, 2018a).

As a volatile gas, methane is hard to contain. In its raw "natural gas" form, it may contain moisture, and acidic gases such as hydrogen sulphide (**H_2S**) and CO_2 that can corrode seals and metal bearings—particularly when the gas contains moisture. Methane can therefore also leak from pipeline connectors and valves (CEPA 2016).

Flaring involves the combustion of natural gas (or liquids) with the intention of reducing the risk of fire or explosion and converting methane into carbon dioxide which is a less powerful climate forcer. Flaring is routinely used for vapours from glycol dehydrators, boiler stills, tanks, flash tanks, and for solution gas produced as a by-product of oil extraction (AER, 2018a).

Flaring can however release unburned methane and other hydrocarbons, carbon monoxide (**CO**), other partially oxidised carbon compounds, H_2S, and other reduced or partially oxidised sulphur compounds (AER, 2018a). Flaring conditions are rarely optimal and factors such as high winds can cause even pure natural gas flares to produce a variety of additional and potentially harmful VOCs (Strosher 1996; Leahey and Preston 2001). Research illustrating the inefficiency of flare stacks in destroying waste gas led to the development of Alberta's Directive 60 (AER, 2018a).

While incomplete combustion and pyrolytic reactions within the flame may emit numerous hydrocarbons, when unprocessed natural gas is vented or leaked other hydrocarbons and compounds may also be present in the gas stream.

Health Concerns with Methane and its Co-Pollutants

Methane is a hydrocarbon—an organic compound composed entirely of carbon and hydrogen—with the formula CH_4. In most situations, methane is not harmful to human health. In the wrong circumstances, such as confined spaces, it can lead to asphyxiation by displacing oxygen (Terazawa et al. 1985). Methane has been associated with acute pneumonitis (lung injury) in occupational settings (Jo et al. 2013) and does pose a fire and explosion risk to workers and nearby residents in some situations.

While methane is not particularly harmful to people, many of the co-pollutants in natural gas are. Raw natural gas is associated with other substances besides methane, including hydrocarbons such as ethane, pentane, propane or butane (AER, 2018a), acid gases such as CO_2 or H_2S, and many different volatile organic compounds (**VOCs**) including the **BTEX** family - benzene, toluene, ethyl-benzene and xylene.

H_2S is highly toxic and can cause knockdown - unconsciousness and potential death - at air concentrations around 1000 ppm. At lower levels of exposure, H_2S can produce pulmonary edema, conjunctivitis of the eye, and paralysis of the olfactory senses (Guidotti, T.L., 2012). The 1-hour ambient air quality objective (AAQO) for H_2S in Alberta is 10 ppb, representing the level at which people perceive H_2S odour, and a 24-hour AAQO of 3 ppb (Alberta Environment 2017).

VOCs are gases that can react with other compounds in the atmosphere, such as nitrogen oxides (**NO_x**), to produce ground-level ozone. Ground-level ozone is the air pollutant that most frequently triggers smog alerts in Canada. It is a gas that it is particularly irritating to the lungs and respiratory system. Short-term exposures to spikes in ground level ozone can aggravate the lungs, worsen asthma symptoms, and increase hospital admissions. There is a growing body of literature which indicates that long-term exposure to lower levels of ground-level ozone can produce asthma, increase the severity of asthma symptoms, increase hospital admissions and premature deaths from respiratory and cardio-

respiratory effects, and negatively affect lung development among young people. In addition, a number of epidemiological studies suggest that ground-level ozone may harm cognitive development and reproductive health (WHO, 2013).

VOCs can include a number of hydrocarbons that are particularly toxic to humans directly. The BTEX family is a good example. Benzene is considered a 'non-threshold carcinogen' because no level of human exposure is considered safe (BC OGC 2007). Toluene, ethyl-benzene, and xylene are considered harmful to human health with prolonged exposure, even at very low levels, and all of the BTEX compounds have been shown to exhibit mutagenic, carcinogenic and teratogenic activity in studies of mammals or humans (Shojania et al., 1999; Atari and Luginaah 2009; Solomon and Janssen 2010). BTEX compounds have also been identified as endrocrine disruptors that can alter fetal development in exposed mothers and lead to lifelong disorders in offspring (TDEX, 2011).

Many different health studies have been directed at the oil and gas sector but they seldom include exposure data and it can be difficult to isolate the exposures that might be directly linked to methane emissions and their co-pollutants, from the exposures that might result from the extraction processes or the combustion of fuels. However, it should be noted that many studies have identified adverse health impacts for residents living in areas associated with natural gas development.

For example, one study conducted in the United States examined associations between birth outcomes and maternal residential proximity to natural gas development. It was a retrospective cohort study of 124,842 births between 1996 and 2009 in rural Colorado. The researchers used natural gas well counts within a 10-mile radius of maternal residence to estimate maternal exposure to natural gas development and compared "exposures" to the rate of congenital heart defects (**CHDs**), neural tube defects (**NTDs**), oral cleft palates, preterm births, and term low birth weights among births in those areas. They found an association between the density and proximity of natural gas wells within a 10-mile radius of maternal residence and the prevalence of congenital heart defects, and possibly neural tube defects (McKenzie et al., 2014).

The researchers reported that the non-genetic risk factors for these two birth defects, that are possibly attributable to natural gas development, include maternal exposure to benzene, PAHs, solvents, and air pollutants such as nitrogen dioxide and fine particulate matter. They note that multiple air pollutants, including benzene and toluene, can be emitted from natural gas extraction during "well completion" and from related infrastructure. They reported that in areas with active natural gas wells benzene levels in air ranged from 0.03 to 6 ppbv in northeast Colorado, while 24-hr average benzene levels ranged from 0.03 to 22 ppbv near active wells in western Colorado. They also noted that two previous cases–control studies have reported associations between maternal exposures to benzene and the prevalence of neural tube defects and congenital heart defects at birth (McKenzie et al., 2014).

While conclusions cannot be drawn from these studies to date, they do suggest that the co-pollutants associated with methane emissions from the upstream oil and gas sector could be associated with serious health impacts, and support actions that minimize these emissions.

Methane Emissions and Levels

Methane is currently not reported to the National Pollutant Release Inventory (**NPRI**) (Canada, 2017a) and it is unclear how estimates of the upstream oil and gas sector's contribution to methane emissions are derived. As of 2017, all facilities emitting 10,000 tonnes or more of GHGs (in CO_2 equivalents or CO2e) were required to report their emissions to the federal government and annual reporting has been required by larger facilities since 2004 (Canada 2018). In the 2016 reporting year, a total of 590 facilities from all sectors across Canada reported methane emissions totalling 11,227,844 tCO2e, with most reporting less than 10,000 tonnes. Of these, 195 facilities reported from the province of Alberta with 68 'conventional oil and gas extraction' facilities reporting a total of 688,826 tCO2e of methane and 31 'non-conventional oil and gas extraction' facilities reporting a total of 1,532,738 tCO2e of methane (Canada, 2017b).

A number of different approaches may be used to measure or report methane emissions. Some approaches involve estimates using 'emission factors' (**EF**) based on processes and volumes, as are currently used to report other emissions, such as criteria air contaminants. The most commonly used EF are those developed by the United States Environmental Protection Agency (US-EPA) as included in AP-42 (US-EPA 2018). However, there are currently no EF for methane emissions from the oil and gas sector.

Measurement techniques such as laser-based radar (**LDAR**), Optical Gas Imaging (**OGI**) cameras, and methane tracking satellites, will likely be employed by oil and gas companies to track/report their methane emissions, or by regulators to ensure compliance with the regulations coming into force in 2020.

A study performed by Greenpath Energy Ltd., employing OGI cameras, in partnership with the Alberta Energy Regulator (AER), found that methane emissions from oil and gas facilities are much higher than reported or estimated. They also found that oil-based extraction/processing facilities were more likely to produce methane leaks than natural gas sites —perhaps due to the focus on the commodity being extracted (i.e. methane is a by-product of oil production, but the primary commodity in natural gas production) (Greenpath, 2016).

A study published in Environmental Science and Technology in 2017, which compared airborne measurements and inventory estimates of methane emissions from Alberta's upstream oil and gas

sector, found that methane emissions may be much higher than currently estimated. In the Lloydminster region of Alberta, for example, airborne measurements of methane were 3 to 5 times greater than both the reported and inventory estimates of methane (Johnson M et al., 2017). Thes

In May of this year, Canada announced funding for the province of Alberta to develop a 'Harmonized Methane Emission Platform' for the oil and gas industry with the goal of managing and sharing methane emissions data across provinces (Natural Resources Canada 2018).

Emissions of Air Pollutants from the Upstream Oil and Gas Sector

It was difficult to find air emissions and air quality data for the criteria air contaminants, VOCs, and specific toxics for the oil and gas sector in summarized formats that supported comparisons geographically or over time. One study conducted by Ramboll Environ (2017), which was directed at understanding the contribution of different sectors to high air levels of fine particulate matter (**PM2.5**) experienced during winter months in central Alberta, does provide some insights into emissions from the upstream oil and gas sector.

Using modelling for two winter months in 2010, the study estimated that upstream facilities in the oil and gas sector (**UOG**) contributed the following emissions to the airshed in Central Alberta, which captures many municipalities including Edmonton, Calgary, and Red Deer:

- 47% of nitrogen oxides (**NO_x**) or 567 tonnes per day
- 61% of total organic gases (**TOG**) or 757 tonnes per day
- 48% of VOCs or 332 tonnes per day
- 38% of sulphur dioxide (**SO_2**) or 282 tonnes per day
- 14% of the PM2.5 or 8 tonnes per day and
- 10% of the PM10 or 8 tonnes per day (see Figure E-1 below).

While emissions of NOx, SO_2 and PM2.5 are likely associated mostly with the combustion of fuels, the emissions of VOCs and TOGs are likely associated mostly with methane emissions and co-pollutants. This study suggests that methane emissions released from the upstream oil and gas sector are a significant source of VOCs that can contribute to the production of ground-level ozone on a regional basis. It also suggests that methane emissions could be an important source of specific VOCs that are particularly toxic to humans.

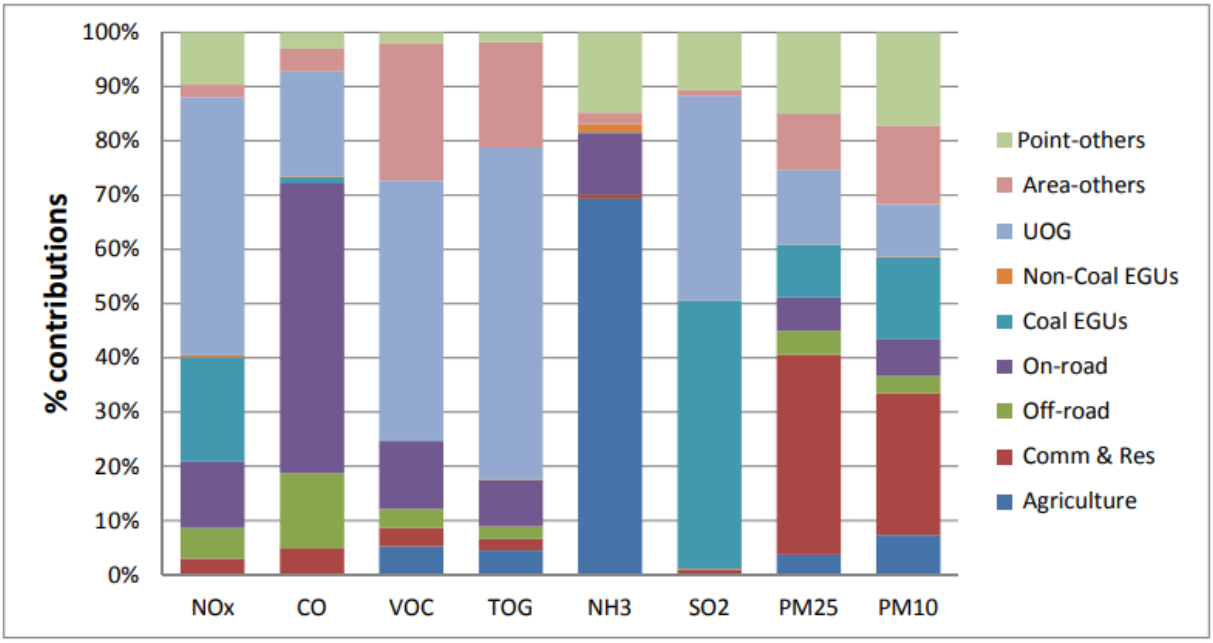

Figure E-1. Daily anthropogenic emissions (percentage of total emissions) within the 4 km domain by source sector (averaged over January-February, 2010).

*[**Reproduced from Ramboll Environ 2017**]*

Reducing Emissions from Upstream Oil and Gas Sector

Several studies led by the Canadian Energy Partnership for Environmental Innovation (**CEPEI**), which included facility-level field testing across Canada, have shown that fugitive methane losses at a site can be reduced by 90 per cent by focusing on just two or three major components through a program of regular basic maintenance. This research has also shown that reductions in methane emissions can increase awareness of health and safety best practices, provide economic savings, improve understanding of system operations and efficiency among workers, and minimize non-methane VOCs for some applications (Klein, 2015).

Comparing Federal Methane Regulations and Alberta's Proposed Directives

Table 1 below compares and contrasts Alberta and federal policies.

The Federal Government estimates that, between 2018 and 2035, its methane regulations can reduce GHGs by approximately 232 MT CO_2e by reducing methane emissions by 40 to 45% of 2012 levels by 2025. The climate change damages to be avoided with these regulations have been valued at $11.6 billion. The federal methane regulations are also expected to reduce VOCs by about 773 kt. The health and environmental benefits estimated from these reductions have been valued at $240 million. It is important to note however that the health benefits were estimated by considering the impact of

VOCs on smog production only; they do not consider the potential impact of specific VOCs such as benzene on human health (Gazette, 2018).

Alberta's newly revised Directive 60 aims to reduce the province's oil and gas related methane emission by 45% compared with 2014 levels by 2025. The section of Directive 60, entitled Vent Gas Limits and Fugitive Emissions Management, describes the requirements designed to meet the Government of Alberta's targets. It applies to all upstream oil and gas facilities with the exception of some oilsands facilities which are regulated under Section 11 of the Oilsands Conservation Act.

Table 1: Comparison of Canada's and Alberta's Methane Regulations

	Canada	**Alberta**
Status	Released in *Gazette* April 26, 2018	Public Comment beginning April 24, 2018
Target	40-45% of 2012 levels by 2025	45% of 2014 levels by 2025
Focus	Practice: leak detection/repair, records, correction, conservation, destruction	Source: compressors, pneumatic devices, glycol dehydrators
Application	All facilities > 60,000 m^3/y	All
Sectors	Emphasis on natural gas, includes offshore installations	Inclusive of oil, solution gas and natural gas production systems
Allowance/limits	Venting, up to 15,000 m^3/y	Up to 900 m^3/day vented or flared (before conservation required)
Goal	Greenhouse gas reduction (CH_4 —> CO_2)	Methane conservation (saleable resource)
Details	Basic Regulatory language Legal Ramifications	More technical discussion and examples More flexibility and accommodation
Economics	Total benefit/cost analysis	Evaluation of specific measures
Enforcement	Into force: 2020 Enforcement: 2023	Into force (fugitive emissions): 2020 Into force (all sources): 2023

Directive 60 provides a lot of details about solutions for both the oil and gas sectors, based on many years of research conducted by the industry/government partners, but it also provides a lot of flexibility and has many voluntary elements. The federal methane regulations identify clear requirements that are mandatory and enforceable

Directive 60 limits emissions from both venting and flaring together to 900 cubic meters of methane per day. If conducted 300 days per year, this would allow 270,000 cubic meters of methane to be released in a given year. This is 4.5 times as much as the federal methane regulations allow for venting alone (15,000 cubic meters per year).

The federal methane regulations focus more on reducing methane by flaring, which can produce potentially harmful hydrocarbons such at BTEX and reactive VOCs that contribute to ground-level ozone, while Directive 60 appears to encourage conservation of these emissions.

Leakage rate thresholds in Directive 60 (S. 10.4) for determining leak repair at fittings is 10,000 ppm (1%), typical of the US standards and of previous work in Canada. The new federal methane regulations (S. 31) apply a 500 ppm trigger, which is much more stringent.

Directive 60 would decrease allowable methane flow rates for all sizes of centrifugal compressors, that are usually driven by gas turbines, from 0.17 cubic meters of methane per minute to 0.06 after 2022. The new federal methane regulations would decrease allowable methane flow rates from 0.34 and 0.68 cubic meters of methane per minute, for turbines less than 5 MW and over 5 MW respectively, to 0.14 cubic meters of methane per minute after 2022. In this case, the Alberta limits are more stringent.

There are probably about 8,000 reciprocating units between 0.75 and 1 MW being used in the upstream oil and gas sector. Directive 60 would establish allowable methane flow rates from reciprocating engine units with multiple cylinders (2-8) to 0.14 cubic meters of methane per minute times the number of cylinders after 2022 using a fleet average. It would also require vent gas control for new units after 2022. The federal methane regulations would reduce allowable flow rates from 0.023 cubic meters per minute times the number of cylinders to 0.001. In this case, the federal limits are much more stringent.

There are several hundred thousand pneumatic control devices being used in the oil and gas sector. They are pressure and temperature controllers, level controllers and transducers for maintaining a process condition, powered by either air pressure or pressurized gas which is released during operation. They can also be small pumps to move a piston which pumps liquids and chemical injection fluids (i.e. mercaptan odorant in the natural gas distribution metering). Directive 60 would require the modification of existing pneumatic control devices with low-venting devices after 2022 unless otherwise approved by the AER. After 2022, all new devices should be low-venting devices.

The leak detection and reporting requirements in Directive 60 are less stringent and more flexible than the federal methane regulations. The federal regulations apply only to facilities that produce more than 60,000 cubic metres whereas Directive 60 covers all facilitates regardless of their production levels. Nonetheless, the annual Leak Detection and Repair requirement and the exemption of well heads in Directive 60 will likely mean far less methane leaks are identified than under the federal regulations which include well heads and require triennial Leak Detection and Repair inspections.

Directive 17 contains a detailed description of the measurement and reporting practices that should be conducted on gases (S 1.7 and 4.3). The relevant guidance clauses are more detailed than in the federal methane regulations.

Section 8.1 of Directive 60 refers to an early June 2019 target for establishing a Methane Reduction Retrofit Plan. This could address some of the major sources of leaks.

Observations, Conclusions and Recommendations

1. Directive 60 provides a lot of details about solutions for both the oil and gas sectors, but it also provides a lot of flexibility and has many voluntary elements. The federal methane regulations identify clear requirements that are mandatory and enforceable. It is essential that the mandatory and enforceable provisions in the new federal methane regulations are not undermined or displaced by Alberta's proposed revisions to Directive 60.

2. Rigorous modelling must be conducted on any methane regulations in Alberta before they are finalized to ensure that they meet or exceed the cumulative GHG reductions identified in the new federal methane regulations. While CAPE does not have the capacity to conduct this analysis, our review of the regulations suggests that the federal methane regulations will result in a greater reduction in methane emissions.

3. The uncertainty associated with estimations of methane emissions from the oil and gas sector is very problematic. The report by Greenpath and the study by Johnson et al. indicate that methane emissions from this sector are much greater than reported by industry and government. This uncertainty has to be addressed by adopting a new 2014 baseline that reflects the research done to date, establishing strong, standardized measuring and monitoring provisions, and ensuring that results are clearly communicated and publicly accessible.

4. It was difficult to find air emissions and air quality data for the oil and gas sectors in summarized formats that support assessment of health impacts and analysis of trends geographically over time. If that data does exist, it should be made more accessible to the public for review and analysis. If it does not exist, then steps should be taken immediately to collect and analyse the data in forms that are useful for the assessment of health risks and policy analysis. This data should include air quality assessments for the toxic co-pollutants in natural gas that present serious health risks for workers and/or residents in nearby communities.

5. The federal accelerated Capital Cost Allowance (CCA), under Class 43.1 and 43.2 of the Income Tax Regulations, allows investors to accelerate the write-off of equipment used to produce energy in a more efficient way. A 50% accelerated CCA is provided under Class 43.2, introduced in 2005 for eligible equipment that generated either a) heat for use in an industrial process or b) electricity by using a renewable energy source (e.g. wind, solar, small hydro), waste fuel (e.g. landfill gas, manure, wood waste) or making efficient use of fossil fuels (high efficiency cogeneration systems). An accelerated CCA should be investigated with NRCan and Finance to incent capital expenditures on methane/VOC prevention and reduction systems.

6. The many field and analytical studies undertaken over the past 30 years on fugitive emissions has shown the subject to be very scientific and labour intensive, in both measurement, screening and preventive application. An extensive training program should be offered in colleges or universities to develop the expertise needed to understand the complex regulations, monitor and screen various gases, and repair or modify the thousands of components across the oil and gas sector. This would have the added benefit of producing new employment opportunities in the oil and gas sector.

7. There is always a balancing act between criteria air contaminants, toxics and GHGs when developing policies related to natural gas. For compressor engine and gas turbine systems, if air standards for NO_x and/or CO standards are too stringent, problems can be created that lead to shutdowns or disruptions in pipelines or processes that result in the release of methane and VOCs. So regulatory policy around criteria air contaminants should consider the collateral impacts on methane emissions that can arise from poor combustion conditions.

Thank you for the opportunity to provide comments on the proposed amendments.

Yours Sincerely,

Kim Perrotta, CAPE Executive Director
Dr. Raquel Feroe, CAPE Member and Resident of Edmonton

cc. The Honourable Margaret McCuaig-Boyd, Alberta Minister of Energy
The Honourable Sarah Hoffman, Alberta Minister of Health
The Honourable Shannon Phillips, Alberta Minister of Environment and Parks and Minister Responsible for the Climate Change Office
The Honourable Catherine McKenna, Federal Minister of the Environment
The Honourable Ginette Petitpas Taylor, Federal Minister of Health

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