Summary of Input on BCER's Methane Reduction Regulatory Policy

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Emission Control Options	• It is critical to consider net-emissions reductions in determining when and where technology is deployed, given the associated costs and increased CO_2 emissions from several conservation and destruction methods. • Due to the potential for poor or no combustion, open flares for control of tank emissions should be prohibited. • Support for the proposed requirement to design new flares, incinerators and enclose combustion systems to achieve a 98 per cent destruction and removal efficiency consistent with other jurisdictions. Tying this requirement to the manufacturer-specified equipment efficiency rating recognizes the potential for equipment downtime. • Support for maintaining all emissions control options, including gas conservation and combustion technologies. Ensure the requirement language includes the proposed 98 per cent destruction efficiency is applicable, while the equipment is operating under normal conditions. This approach allows for temporary variability in destruction efficiency during startup, shutdown, maintenance, inspection or repair.
Decision Tree	• General support for decision trees but some feedback anticipates encountering unique situations that may warrant special consideration, such as where site access limitations outweigh the benefit of OGI surveys, or tanks with very low associated emissions could result in an overall increase in emissions if significant makeup gas is required to maintain emissions controls. • The decision tree approach may mitigate ambiguity and the risk of unintended incorrect applications. • Suggestion the elements of the decision tree be carefully considered and crafted to avoid generating exemptions that undermine regulatory efficacy. • Use of a decision tree helps provide flexibility and guidance to operators particularly as industry heads towards abating a broader range of sources, which may present unique circumstances. Economic feasibility is an important consideration.

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	• Support for the use of decision trees to evaluate reduction action based on safety, as well as technical and economic feasibility. • Suggestion that removing the economic feasibility criteria from the decision tree would align with some other North American jurisdictions. The decision tree should be carefully considered and crafted to avoid generating abundant exemptions that undermine regulatory efficacy. • Suggestion that the BCER pursue regulatory alignment on decision tree outcomes with other policies and requirements (e.g., Flaring and Venting Reduction Guideline and permits issued under the Waste Discharge Regulation); identify additional decision tree options or branches to address more scenarios and introduce clear definitions where technologies are referenced (e.g., "best technology economically available")

New Facilities and Amendments	• Support for emission requirements at new facilities with clarity on the definition of, or triggers for, the threshold of amendments. For example, minimizing new surface disturbances can increase facility amendments.
	• Extend the prohibition on routine venting at new facilities to all equipment that feeds into the listed components, including separators.
	• No concerns with the proposed regulatory requirements for new, large facilities.
	• Provide exceptions for some facility amendments, such as:
	  o Where facility equipment is not practical to modify
	  o When equipment has been ordered during the permitting process and a permit is issued after Jan. 1, 2025
	  o Exemptions for the expansion of wellpads (facility amendments)
	• Clarification is needed regarding the application of vent elimination from sources during facility amendments, such as what constitutes a facility amendment and whether the vent elimination applies to the entire site or is contained within the project boundary being amended.
	• Support for the methane abatement requirements for new facilities and comments that the proposed exceptions are practical and provide operators with sufficient flexibility

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Existing Facilities	• A near-elimination target could make multiple operations uneconomical, resulting in early production shutdowns. Decision trees could mitigate this, but research could develop cost-effective solutions for edge cases. Near elimination target could make multiple operations uneconomical and result in early shut-in of production. Could be mitigated by decision tree but research could develop cost-effective solutions for edge cases. • Other national and international jurisdictions have proposed significantly faster timelines for phasing out existing emitting equipment, prohibiting routine venting and strengthening operational requirements to drive down methane emissions swiftly and substantively. Therefore, strengthening regulations for existing facilities should occur much sooner than 2035. • Existing facilities (brownfield sites) were sanctioned, designed and constructed under different regulations. Brownfield retrofits carry additional costs and will encounter operational and/or physical challenges to implement compared to new (greenfield sites) construction. Aging fields naturally deliver methane emission reductions in the form of reserve life indices and infrastructure lifecycles. Therefore, imposing further methane emission reduction regulations may accelerate the methane emission reduction through premature shut-ins. • More stringent methane emission regulations for existing facilities should be applied at an existing fleet average approach, wherever possible, to best optimize the deployment of efforts and capital, allowing operators to deliver the desired overall methane emission reductions at the fields and sites where it makes the most sense. • Supports the intent to align existing facility requirements with the Province's aspiration to achieve near elimination of methane emissions by 2035.
Pneumatic Pumps and Devices	• Consider in the regulatory development that the DPR does not hinder access to incentives. • Further clarity needed on whether 50 per cent reduction of pneumatic pumps and devices applies to the sector or individual operators and need to consider potential disadvantage for early movers. Support for regulation to eliminate all emissions from pneumatic pumps and devices by 2035, if projects remain eligible for funding. • Support for the intent to eliminate all emitting devices and pumps by 2035. If the proposed requirement to reduce emissions from pneumatic devices and pumps by 50 per cent by Jan. 1,

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	2030, relative to Jan. 1, 2023, is applied to individual operators, a 2023 baseline year will disadvantage companies that took early action in converting pneumatics. • The proposed 50 per cent reduction of emissions from pneumatic devices at existing facilities by 2030 falls considerably short of regulatory proposals in other jurisdictions, given the cost effectiveness of these reductions and the range of solutions to achieve such reductions. Therefore, the BCER should consider international jurisdiction as a best practice to require all existing pneumatic devices and pumps to be zero-emitting or capture their emissions by 2025. • Allow venting from emergency shutdown pneumatic devices and those devices that meet the decision tree criteria. Gas hydraulic actuators, which only emit intermittently, are primarily used in transmission because their characteristics offer high reliability in the event of an emergency and in remote locations. • To recognize companies that took early action in converting pneumatics, an approach to establish a maximum limit for pneumatic methane emissions by operator based on wells and facilities in active operation on or before Jan. 1, 2021, is suggested. The methane factors proposed are supported given they are modelled to deliver the required reductions.
Compressor Seals	• Compressor requirements should not include crankcases. Crankcase emissions cannot be completely abated due to safety concerns. • Due to the potential for significant methane emissions from compressor seals, for existing facilities beginning in 2025: o Revise and lower the maximum emissions standards for reciprocating compressors to 0.82 m^3/hr/throw. o Exclude large, controlled reciprocating compressors from the calculation of fleet average to avoid skewing the average down and compromising regulatory efficacy. o Match the U.S. EPA's proposed emissions standard of 3 scfm (0.08 m^3/minute) for existing wet seal and all dry seal centrifugal compressors which is consistent with international jurisdictions.

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	• Support for the proposed limits for fleet average and maximum per unit rates. It is proposed the measurement frequency under DPR section 52.04 (7) (c) be extended to once every second year (biennial) as current annual testing is frequent relative to value provided. • Support for the continued reduction of methane emissions from compressor seals and the BCER's proposed limits. There are opportunities to streamline testing requirements given that compressor seal failures are rare and are typically identified by operators outside the scope of current mandatory seal testing requirements. • Given the power rating of some compressors, the existing compressor venting limits in the DPR are difficult to achieve with currently available technology. For continuity with current DPR requirements and added clarity going forward, specify emission control options (e.g., conservation or destruction) as allowable means to satisfy compressor venting requirements for new facilities. • A performance standard in the form of a fleet average requirement should be introduced and supported by strong monitoring, reporting and verification requirements (including crankcase venting).
Engine Exhaust	• Develop a clear policy approach to address compressor engine exhaust including improved quantification methods and reporting requirements. • Need to understand implementation cost and operational potential of new technologies. Requirements should provide exemption for low operation hour engines (e.g., essential service generators (ESG) at electrified facilities). Recommend exemption based on 3-year average run time, not annual run time. • Proposes that methane emissions from engines be regulated by Environment and Climate Change Canada (ECCC) under the Multi-Sector Air Pollutants Regulations (MSAPR). • Support for the intent to reduce emissions from compression engine exhaust but further study is required to better understand this source and abatement options before developing regulatory requirements. Regulatory timelines should consider the availability of deployable technology and time required to design, order and install new equipment.

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	• Suggestion to use existing engine exhaust regulations (e.g., MSAPR) rather than DPR requirements to prevent duplicative or conflicting requirements.
	• Improve understanding of engine methane emissions by:
	  o Updating industrial reporting methodologies to require companies to report engine and compressor combustion emissions based on engine specifications, not generic emission factors.
	  o Requiring companies to submit a detailed compressor inventory if they do not have to do so already.

Glycol Dehydrators	• Support for the requirement that new facilities achieve no routine venting from glycol dehydrators effective 2025. The 25 tonnes/year of methane fleet average approach proposed for existing facilities starting in 2025 will allow operators to focus on higher emitting systems or those with longer asset life.
Uncontrolled Tanks	• Align with other jurisdictions for volatile organic compounds (VOCs) from tanks should be considered for B.C. methane reduction regulations. • Stricter limits for uncontrolled tanks should be imposed in 2025 instead of 2035 as research shows storage tanks to be a far greater contributor to methane emissions than was previously thought. • Support for the proposed requirements but requirements should recognize technical challenges for reductions especially for cases where emissions are low. Suggest research and aerial measurements update the magnitude of this source. • Ensure clarity around the definition of uncontrolled tanks (e.g., if referring to just hydrocarbon tanks) and suggest definition includes both permanent and temporary tanks. • Propose methane emissions from existing tanks be regulated under B.C.'s DPR with a max stock tank vent rate of 12 m^3/hr for facilities that began operations before Jan. 01, 2022. Apply a max stock tank vent rate of 1.7 m^3/hr for facilities constructed between Jan. 1, 2022, and Jan. 1, 2025, when the tank design is not adequate for vent control to be installed. • Combustion of tank venting should be allowed only where operators demonstrate that capture and onsite use or sales are not feasible.

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	• Many open to atmosphere tanks were designed for atmospheric conditions and without adequate pressure and vacuum design ratings, installation of vent gas control can prove challenging. Fitting a vapour recovery unit (VRU) to a tank with a marginally adequate pressure rating can result in the VRU operating in a narrow band and therefore, unable to keep up with rate changes. This results in tank overpressure protection relieving not only the production gas, but also the make-up gas required for vapour recovery operations to maintain an air free environment. • Ensure all sources of emissions that have technical solutions for reductions are included in the definition of routine venting from tanks; -including flashing, breathing, and working losses, as well as gauging and loadout. On new tanks, operators should install equipment for gauging or sampling of liquids without opening the hatch, similar to what is required in other jurisdictions. Supports the proposed requirement for no routine venting from new uncontrolled hydrocarbon storage tanks at processing facilities by 2025. Supports eliminating routine venting from existing uncontrolled hydrocarbon storage tanks by the proposed 2035 timeline, as elimination is challenging and supports to exempt tanks with intermittent operations and those guided by B.C.'s decision tree approach. • Clarity on whether the requirement for no routine venting from uncontrolled tanks applies to production tanks or all tank types. Tanks on gas transmission systems are small and only used to receive material drained from separators, store lube oil for compressors or store used oil from generators. Venting from these types of tanks is intermittent and extremely small in volume compared to production tanks.
Well Liquids Unloading	• Support for the intent of the proposed requirements. Ensure regulatory language is appropriate for compliance and the application of emissions controls. • Ensure requirements for feasibility assessments are not general and result in administrative burden. • Well liquids unloading events are infrequent and of short duration. Conservation and/or destruction opportunities may be limited for existing infrastructure, depending on facility design, process conditions, lease size and accessibility. • Further clarity on allowable practices.

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Pipeline Blowdowns	• Support the intent of the proposed requirements. Ensure regulatory language is appropriate for compliance and the application of emissions controls. • Ensure requirements that feasibility assessments are not general and result in administrative burden. • Blowdown events from pipelines and facilities are infrequent and of short duration. Conservation and/or destruction opportunities may be limited for existing infrastructure depending on facility design, process conditions, lease size and accessibility. • Significant methane emissions result from both routine and non-routine equipment blowdowns, which are used to relieve pressurized gases from systems before maintenance work or shutdown. Regulations for routine and non-routine pipeline blowdowns should be extended to compressor blowdowns. • Adding customer supply impacts to the list of feasibility considerations for mitigating planned pipeline blowdowns. Additional outage time to accommodate supplementary emission control measures may mean customers are without access to gas for longer. • Clear requirement to exempt emergency pipeline and facility blowdowns. The use of methane mitigation measures in emergency situations is not feasible because these situations are time sensitive and require timely evacuation of gas. • By 2025, require existing facilities to demonstrate non-routine sources of venting such as pipeline blowdowns are minimized, similar to the requirement for new facilities
Surface Casing Vent Flows	• Support the intent of the proposed requirements but clarity is required on the estimated inventory of wells with SCVFs above the proposed threshold. A $3m^3/d$ threshold could represent a very significant inventory and industry undertaking, creating challenging timelines for assessment and implementation. Further, clarity needed on the proposed “leak off pressure” threshold. • In assessing wells with surface casing vent flows for controls, requirements may benefit from explicit flexibility around potential actions and control options. Remote sites, dry conditions or low flow rates (requiring the use of make up gas) could increase the risks or emissions impact of well intended controls.

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	• Proposes a decision tree approach be developed for SCVF control options. Implementing conservation or combustion could lead to more emissions than the source due to the additional fuel/pilot gas required to maintain safe operation of conservation and combustion equipment. • Supports all criteria be met prior to requiring control and reporting such as drilling records can provide adequate assurance. Further clarity on the timeline for control measures for qualifying wells is needed and timely implementation is supported. It is suggested to require a control measure within 90 days (with an exception process for extenuating circumstances) of detecting a qualifying well with a flow rate greater than 3 m^3/d. Guidance on venting options or exceptions for the purpose of SCVF evaluation and remediation is also needed. • Suggestion to include clarification in the regulation that if a SCVF vent volume cannot be controlled between 3 and 100 m^3/d, then it continues to vent until conditions change that would require it to be reassessed or the SCVF exceeds 100 m^3/d.
Surface Casing Vent Flows – Burst Plates	• Supports B.C.'s intent to further reduce surface casing vent flow emissions. The proposed criteria provide clear guidance to operators on when they must implement emissions control. Installation of burst plates could result in gas pooling in shallower or lower pressure gradient zones if the path of least resistance to the surface is cut off. Repairing surface casing vent flows could subsequently become more difficult as a result of pooling gas. • While burst plates are effective in controlling SCVF, installation could result in gas pooling in shallower or lower pressure gradient zones, if the path of least resistance to the surface is cut off. This could potentially impact the reliability of SCVF source identification. Further guidance is needed managing this potential situation. Support relying on the current monitoring requirements for well facilities. Further clarification needed on whether the current requirement (annual full flow and pressure build-up test to assess SCVF status) will change for wells with burst plates. If so, are there any specific testing protocols or exemptions that will be put in place, it will be important to provide further guidance to facilitate compliance and avoid ambiguity in the event that plates burst are used. • The current approach to SCVFs is supported and the proposed approach could result in beneficial emissions reductions. The targeted use of burst plates and other control options could reduce

Topic	Summary of Input Received
	emissions and simplify SCVF management. However, clarity on the intent of the proposed approach will ensure efficient implementation of the new requirements.
Leak Detection and Repair	• Supports OGI 4 times per year at large facilities. • Explicit requirements for annual AVO surveys at inactive B.C. wells are worth considering but reporting negative (no leak) results would create unnecessary administrative burden. There are alternative means to ensure compliance. • Exemptions to the leak detection and repair (LDAR) requirements for both active and inactive wells should be considered for those sites which are remote or winter-access only and require long driving distances or helicopter access. • Robust LDAR requirements are, therefore, indispensable for accurate emissions accounting, reducing fugitive emissions and meeting climate targets. By 2025, the following should be considered: o Require monthly LDAR at all facilities while explicitly mandating instrument-based detection methods. If a monthly instrument-based LDAR requirement is determined to not be feasible, then extend the requirement to facilities determined to be high-risk based on presence of equipment frequently associated with leaks and malfunctions, such as tanks or separators, while extending a quarterly requirement to lower-risk facilities. o Require annual LDAR at inactive wells, while mandating instrument-based detection methods. • The March 27, 2023 amendment to the DPR with new DPR Sections 41.1 (10) and (11) is of concern, as there is limited availability of commercial devices capable of measuring fugitive emissions. Additional time required for an OGI surveyor to measure a fugitive emission after detecting it results in a substantial time addition to the surveyor's workflow. • Recommend operators be allowed to calculate and report their detected leak flow rates using measurement or estimation/emissions factors.

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	• Support using data in designing a proposed approach to require Optical Gas Imaging (OGI) surveys at large facilities four times annually, an annual OGI survey at all other facilities that handle natural gas and the requirement for an annual audio visual and olfactory (AVO) survey at inactive well sites.
Leak Detection and Repair – Alternative Programs	• A simplified alternative LDAR application process is desired. Alternative leak detection approaches will be especially valuable to reduce the cost associated with inspections at individual wells. Annual OGI surveys represent a significant cost to operators associated with nominal per-well emissions reductions. Alternative leak detection methods are required to identify emissions sources more efficiently. In the absence of an effective alternative, many wells, in particular conventional wells, will test the application of the decision tree approach. The economics of maintaining mature producing assets will become more challenging to justify over the long-term as leak detection costs accumulate in the absence of actionable leaks. • Research (Methane Emissions Research Collaborative or MERC) could develop alternatives that could be approved by regulators. • LDAR requirements contained within the regulation should explicitly account for the efficient approval and deployment of alternative fugitive emission management programs (Alt-FEMPs) • Modelling requirements to show equivalency are barriers of entry for Alt-LDAR. Recommend technology-based approvals and the consideration of approved plans being used by others. • Agree that an Alt-LDAR program needs to be developed in the regulations and allow for the application of Alt-LDAR without having to submit additional documentation for approval prior to implementing. This will need to include provisions to be equivalent for the inactive well AVO screenings and active well OGI surveys on conventional wells • Supports intent to incorporate explicit alternative leak detection and repair (LDAR) language. Value in having the BC Methane Emissions Research Collaborative identify equivalent LDAR approaches that could be adopted by BC and then more readily adopted by operators without the administrative burden of an application process for identical programs.

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	• Including language for alternative leak detection and repair (alt-LDAR) programs. Alt-LDAR programs give operators the flexibility to implement innovative or emerging methods and technologies that will achieve the same or better reductions than regulatory LDAR Programs.
Leak Detection and Repair – Thief Hatch Monitoring	• Thief hatch monitoring requires additional testing and research. Testing of existing technologies with current operations monitoring, as there may be opportunities to use existing pressure and flow monitors as indicators of an open thief hatch. • Requirements for thief hatch leak monitoring systems should be technology agnostic to account for cost efficiency, operational considerations and future technology development. • Confirm which technology options are acceptable for thief hatch monitoring. • Submit that controlled storage tank thief hatch leak monitoring needs to maintain flexibility due to currently available technology for detecting leaks. Consideration must be given to leak detection by balancing metering and site alarms. • Encourage focused efforts on tanks with emitting potential and to provide flexibility to operators. Example, broader site fugitive monitoring technologies or existing pressure and flow monitors may be sufficient to detect open thief hatches without the need for redundant component-specific sensors.
Other	• A recommendation for a “super-emitter” response program. The U.S. EPA recently proposed a new program intended to supplement LDAR inspections and to find additional “super-emitters” between routine LDAR inspections • The near elimination target by 2035 pushes methane emissions regulations to the edge of what is technically and economically feasible given current technology and the need for continued safe operations. • Define routine and non-routine emissions to ensure consistent treatment of these emission sources. Gas transmission facilities have distinct emissions profiles with few routine emissions sources (e.g., continuous or intermittent equipment-level venting). These emission sources, such as compressor seal venting, are already addressed in the current DPR. Further, there may be instances where residual emissions could persist after the application of an emissions reduction technology.

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	For instance, where the main actuation force of a gas hydraulic actuator is paired with gas conservation or destruction equipment, connecting all the small auxiliary pneumatic devices (e.g., solenoid valves, pressure pilot valves, regulators, and relief valves) to the same gas conservation or destruction equipment may be technically challenging. Encourage this type of scenario be included in a decision tree for exception. • Recommend strict penalties for not following reporting requirements. Enforce penalties that exceed the cost of compliance.