

2021 Equivalency Report

Agreement on the Equivalency of Federal and
British Columbia Regulations Respecting the
Release of Methane from the Upstream Oil and
Gas Sector in British Columbia, 2021

March 14, 2023



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1. Introduction

The [Agreement on the Equivalency of Federal and British Columbia Regulations Respecting the Release of Methane from the Upstream Oil and Gas Sector in British Columbia, 2020](#) (Equivalency Agreement) came into force on March 25, 2020 with the publication of a [final order](#) under section 10(3) of the [Canadian Environmental Protection Act](#) (CEPA). As a result, the following federal regulations no longer apply in British Columbia (B.C.): [Regulations Respecting Reduction in the Release of Methane and Certain Volatile Organic Compounds \(Upstream Oil and Gas Sector\)](#).

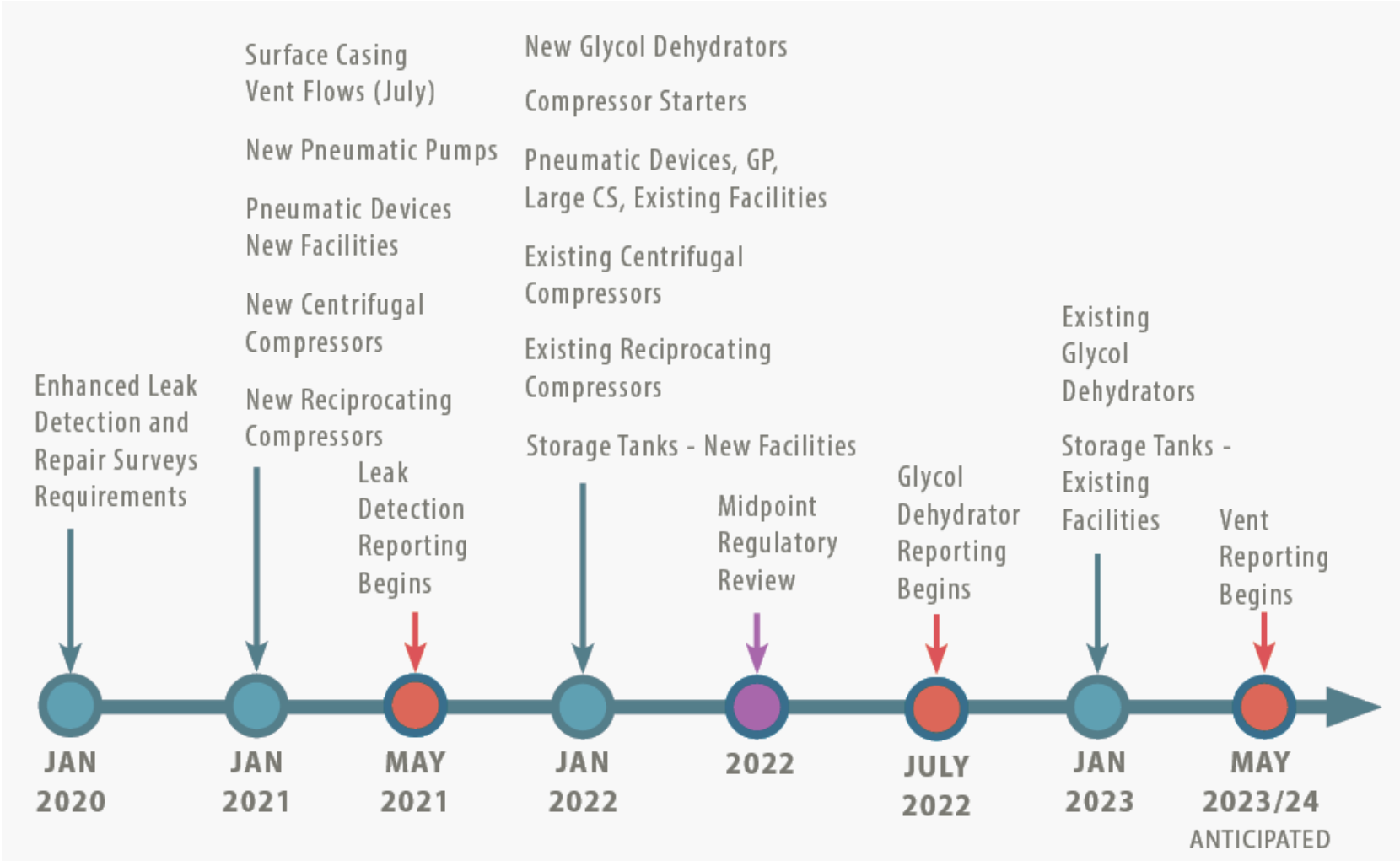
Under the Equivalency Agreement, the provincial methane regulations, which were introduced in December 2018 through amendments to the [Drilling and Production Regulation](#) (DPR) under the [Oil and Gas Activities Act](#) (OGAA), apply in B.C. instead. These methane regulations came into force on Jan. 1, 2020 and are the primary policy instrument for achieving the Province's 2025 methane emissions reduction target of 45 per cent below 2014 levels.

The provincial methane regulations set emission limits on fugitive emissions and venting sources from B.C.'s upstream oil and gas industry, which include requirements for leak detection and repair (LDAR), pneumatic devices, compressors, glycol dehydrators, storage tanks and surface casing vents. The LDAR provisions, aimed at reducing emissions from fugitive sources, became effective when the regulations came into force. The remainder of the provisions, targeting venting sources, have differential effective dates ranging from January 2021 to January 2023, depending on the age of the facility (see Figure 1).

This document reflects reporting obligations under the Equivalency Agreement for the 2021 calendar year only. As such, it focuses on the LDAR provisions, surface casing vent flows and requirements for pneumatic devices at new facilities, and new installations of pneumatic pumps and compressors.



Figure 1: DPR Implementation Timeline for Methane Provisions



The provincial methane regulations were developed by the BC Energy Regulator (BCER), in collaboration with the Ministry of Energy, Mines and Low Carbon Innovation and the Ministry of Environment and Climate Change Strategy, with input from industry and environmental groups. At the time the methane regulations were developed, the BCER committed to complete a review of the regulations for efficiency and effectiveness. The review is currently underway, with completion targeted for the end of 2022.

2. Summary of Reporting Obligations under the Equivalency Agreement

Section 3 of the Equivalency Agreement requires B.C. to provide Canada with information representing the previous year (2019) no later than Dec. 31, 2020, and subsequently, on an annual basis. By no later than December 31, the following information for the previous calendar year is provided:

- A. The number of existing facilities and wells that are subject to the DPR and, as of January 1 of the year data is being submitted for, the number of new facility and well permits issued in the preceding year and the number of closures of facilities and wells, with all information disaggregated by well type and facility classification (as specified in the DPR), and other types of facilities.
- B. Information assessing the implementation and effectiveness of the DPR in reducing methane emissions (in CO₂e), including the methodology, analysis undertaken and results of calculations of emission reductions.
- C. A summary of compliance verification activities and enforcement or sanctions measures applied to facilities and wells, segregated by well type and facility classification, including the number of inspections, verifications other than inspections, equipment repairs completed to comply with the DPR requirements, the number and type of non-compliance events and the orders, penalties and convictions.

3. Part A: Facility and Well Counts

Table 1 shows the overall number of natural gas and oil facilities in B.C. in 2020 and 2021, disaggregated by facility status. Further to the explanatory notes provided, there were 56 new facilities and 418 facility closures in 2021.

Please note the data summarized in Table 1, and subsequent tables in this report, are for January of each reporting year due to the way data is stored in the BCER's internal database for oil and gas infrastructure and associated inspections.

Many facilities with Active status are now inactive, suspended or removed. The BCER is continuing to work with permit holders to update and correct the status of their facilities. In addition, some active facilities exist for production reporting purposes only and do not correspond to physical facilities.

Table 1: Summary of Facility Status

Facility Status	Number of Facilities	
	2021	2020
Active	7,319	7,672
Cancelled	12,087	12,069
Construction Complete	21	21
Inactive	793	653
Permit Approved	349	366
Removed	1,710	1,508
Suspended	1,216	1,158
Under Construction	88	80
Total	23,583	23,527

Note: Linkages to Part A of the Equivalency Agreement: Existing facilities denoted as “Active” facilities must undergo LDAR surveys when they are operating. Facility closures include “Cancelled”, “Inactive”, “Suspended”, and “Removed” statuses. A facility with one of these statuses does not undergo LDAR surveys because they are no longer operating, never existed or no longer exist. New facilities include “Construction Complete”, “Permit Approved”, and “Under Construction”. As they are not operating yet, no facility with one of these statuses must undergo LDAR surveys. Facilities receive a “Removed” status after the permit holder submits a Remove Facility notice of intent to the BCER, indicating that all equipment and associated piping have been removed from site.

Table 2: Summary of Well Status

Well Status	Number of Wells	
	2021	2020
Abandoned	8,783	8,260
Active	9,930	9,934
Cancelled	5,788	5,741
Inactive	1,765	2,473
Suspended	5,856	5,314
Under Development	217	189
Well Authorized	2,778	2,704
Total	35,117	34,615
<i>Note:</i> Linkages to Part A of the Equivalency Agreement: Existing wells include “Active” wells, and these must undergo LDAR surveys when they are operating. Well closures include “Abandoned”, “Inactive”, “Suspended”, and “Cancelled” statuses. Wells, with one of these statuses, does not undergo LDAR surveys because they are no longer operating, never existed or no longer exist. New wells include “Under Development”, and “Well Authorized”. Wells, with one of these statuses, do not undergo LDAR surveys.		

Table 2 shows the overall number of wells in B.C. in 2020 and 2021, disaggregated by well status. Further to the explanatory notes, there were 502 new wells and 404 well closures in 2021.

4. Part B: Implementation and Effectiveness

As noted in the Introduction, the following regulatory requirements were in effect in 2021:

- Leak Detection and Repair (LDAR) for wells and facilities.
- Surface Casing Vent Flows.
- Pneumatic Devices at new facilities; and
- New installations of pneumatic pumps, and centrifugal and reciprocating compressors.

Implementation of the regulatory requirements are assessed by a variety of means. For requirements related to new equipment installations and new facility construction, compliance is assessed by engineering reviews of facility designs at the permitting stage, followed by facility start-up inspections and reviews of as-built drawings.

Surface casing vent flow requirements are monitored through field inspections of wells combined with testing and reporting requirements. Testing and reporting requirements for surface casing vent flows are set out in sections 41(2) to 41(4) of the DPR. If a surface casing vent flow test exceeds the maximum flow threshold, the permit holder is required to identify and implement

mitigations which may include repair and decommissioning of the well, production, combustion or installation and monitoring of a burst plate or pressure safety valve.

Implementation of LDAR requirements are monitored through annual submissions of data on LDAR surveys combined with data on well and facility status in addition to inspections for leaks during regular inspections of wells and facilities.

The Province measures the effectiveness of its regulation through a modeling framework and the Provincial Greenhouse Gas (GHG) Emissions Inventory. The provincial modeling framework is comparable to the federal methodology outlined in the Environment and Climate Change document *Upstream Oil and Gas Fugitive Emissions Model, Methodology and Documentation*. Both methodologies are continuously updated as new research into methane emissions is released. In 2022, the updates focused on parameters to reflect the data and assumptions used in the compilation of the 2022 National Inventory Report. The Province's modeling framework suggests the Province will meet the 45 per cent reduction target by 2025 under the current regulatory

framework, in line with federal expectations. The Province, though, will continue to investigate emission sources and improve inventory methods, acknowledging recent studies have found discrepancies between official bottom-up inventories and measured top-down inventories. The most recent data from the provincial 2020 GHG Emissions Inventory report shows methane emissions from the upstream oil and gas sector have decreased by 19 per cent from 2014 to 2020.

The BCER has assessed the effectiveness of the DPR methane emissions regulations by conducting a [regulatory review](#). The review found the Province is on track to meet the 2025 methane emissions reduction target and therefore focused on changes that are intended to provide clarity and improve the administration of the regulation including definitions, data collection and reporting, flare performance monitoring, and moving key provisions related to leak detection and repair surveys from guidance to regulation. To ensure the effectiveness of the regulations from a compliance perspective, the BCER has encouraged compliance awareness and promotion through various means (Section 5.1.1) and conducted an LDAR submission

compliance review (Section 5.1.3). The results of the compliance review can be found in Section 5.3.4. In addition, to address key challenges in tracking LDAR compliance, the BCER has launched a review initiative to improve data and modify the eSubmission system (Section 6.1).

Additional analysis of 2021 LDAR data collected has also been conducted. The results, which are shared in Table 11, show gas processing plants and compressor dehydrator facilities account for 85 per cent of the total leak volume detected. This suggests continued focus on these facilities has the greatest potential to reduce fugitive emissions and confirms these facility types should continue to require more frequent LDAR surveys.

In 2021, the BC Oil and Gas Methane Emissions Research Collaborative (MERC) commissioned a study to continue the work being done in B.C. to further its understanding of methane emissions from the oil and gas sector. The project, led by the Energy and Emissions Research Laboratory out of Carleton University, focused on creating a measurement-based inventory and identifying the root causes of prevalent methane sources. The research highlighted compressors, storage tanks, and unlit flares as significant sources for the province and re-iterated the discrepancies between inventories. Additional information on the project can be found on the BC Oil and

Gas Research and Innovation Society website (www.bcogris.ca).

To continue investigating the robustness of a top-down inventory, as well as measure the impact of the regulations, the Province has signed an agreement with Carleton University to continue aerial measurement surveys annually between 2022 and 2024. Annual measurement campaigns will track the reductions, as new requirements under the regulation come into effect.



5. Part C: Compliance and Enforcement

5.1: Overview of BCER LDAR Compliance Framework

5.1.1: Compliance Awareness and Promotion

To date, the BCER has encouraged compliance awareness and promotion in the following manner:

1. Stakeholder consultation activities related to the development and review of the regulations;
2. BCER methane webpage materials, technical guidance and information bulletins;
3. Direct engagement with permit holders on data collection and submission.

5.1.2: Inspections Framework for LDAR

An important part of the BCER's Compliance Management System is proactive inspections of permit holder activities and documentation of alleged non-compliances. Inspection results, including any non-compliances identified, are tracked and shared with permit holders for action. Non-compliances identified through BCER inspections are referred to as "deficiencies" according to its Compliance Management System. If a deficiency is not addressed, the BCER may respond with escalated enforcement action (Figure 2).

5.1.3: LDAR Submission Compliance Review

In addition to inspections, the BCER conducted an administrative review with respect to industry compliance respecting LDAR reporting requirements. Following the review, the BCER followed up directly with permit holders that had missing submissions.

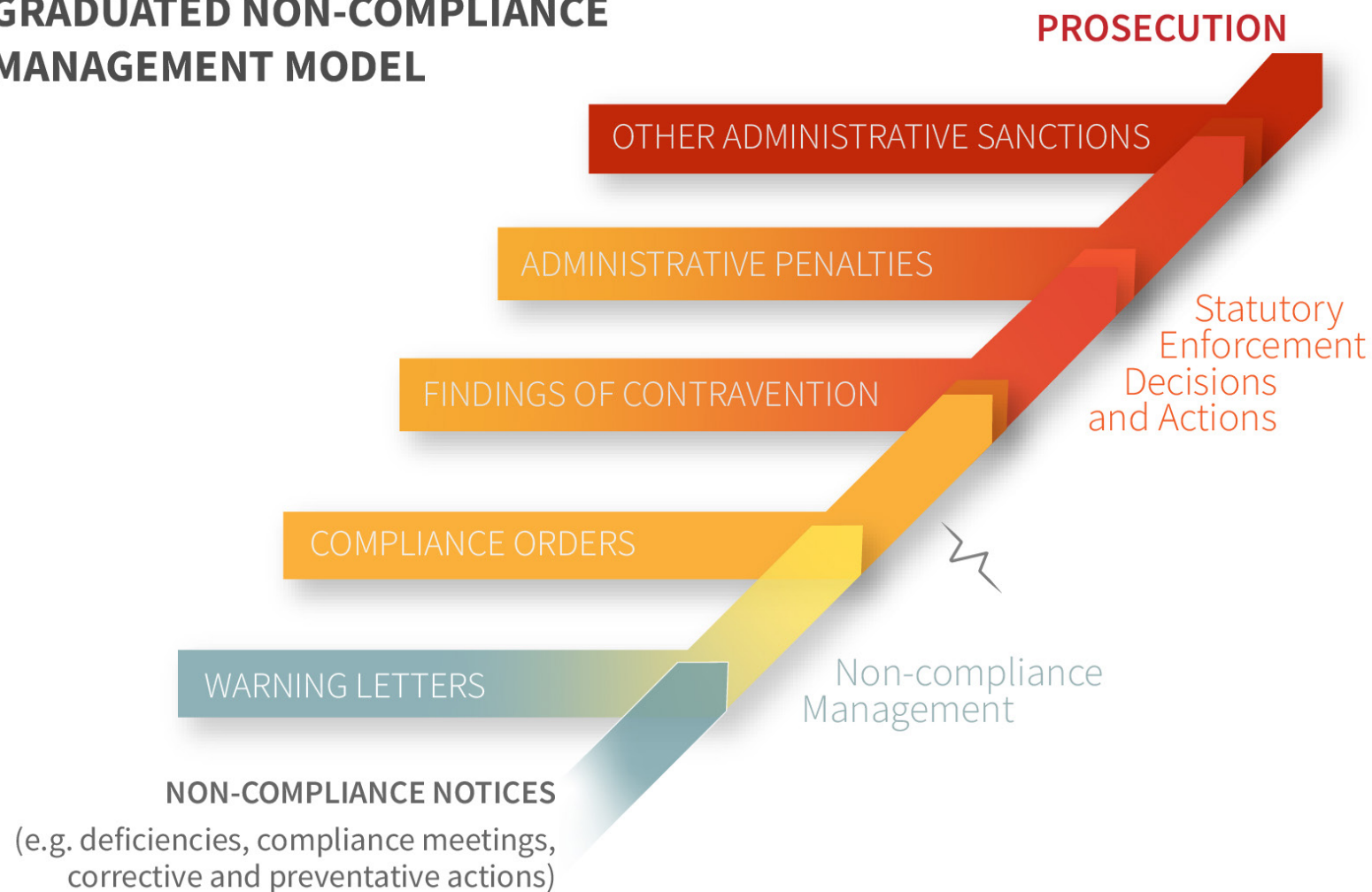
For 2021 LDAR surveys, the compliance review addressed two focus areas:

1. Assessing survey completion and operational status for each well and facility listed as having active status.
2. Assessing compliance with the required number of surveys and minimum survey spacing for natural gas processing plants.

Based on the findings of the compliance reviews, the BCER has initiated seven enforcement investigations. The enforcement investigations are currently in progress. An enforcement investigation may result in a statutory enforcement decision or action (Figure 2) depending on the outcome of the investigation.

Figure 2: Non-Compliance Management

GRADUATED NON-COMPLIANCE MANAGEMENT MODEL



The BCER conducted 12,372 facility and well inspections in 2021, some of which included the use of optical gas imaging (OGI) technology.

5.2: 2021 BCER Inspections Data

Table 3 details the field-based facility inspections carried out by BCER staff in 2021. Overall, 4,078 inspections were conducted across facility types. The BCER has documented procedures for detecting and reporting leaks and spills, including methane leaks. Leaks, spills, and unauthorized emissions are a primary focus area of inspections. In aggregate, the BCER issues more deficiencies related to leaks, spills, and unauthorized emissions than for other items.

Most inspections detect methane leaks through personal gas monitors and/or audio, visual, olfactory (AVO) indicators, and are denoted as “regular inspections” in this report. There were 27 inspections using OGI technology.



Table 3: Summary of Field-Based Facility Inspections Conducted by BCER Staff in 2021

Facility Type	Number of Inspections		
	Total Inspections	Regular Inspections	Inspections Involving OGI
Battery Site	163	160	3
Compressor Dehydrator	112	109	3
Compressor Station	83	82	1
Disposal Station	34	34	0
Gas Dehydrator	22	22	0
Gas Processing Plant	46	46	0
Gas Sales Meter	75	72	3
Injection Station	11	11	0
Oil Sales Meter	12	11	1
Pipeline Gathering	6	6	0
Processing Battery	22	18	4
Pump Station	2	2	0
Satellite Battery	79	79	0
Tank Terminal	1	1	0
Test Facility	9	9	0
Water Hub	5	5	0
Well Facility	3,392	3,388	4
Total	4,074	4,055	19

Table 4 shows the field-based well inspections carried out by BCER staff, across well types, in 2021. Overall, 8,294 inspections were conducted, eight of which involved the use of OGI technology. About 76 per cent (6,271) of the inspections conducted were of gas wells.

Table 4: Summary of Field-Based Well Inspections Conducted by BCER Staff in 2021

Well Type	Number of Inspections in 2021		
	Total Inspections	Regular Inspections	Inspections Involving OGI
Acid Gas	7	7	0
Gas	6,271	6,270	1
Multiple Gas	543	540	3
Multiple Oil and Gas	35	35	0
Multiple Oil	80	80	0
Oil	590	586	4
Solvent Injection	1	1	0
Undefined	547	547	0
Water	213	213	0
Total	8,287	8,279	8
<i>Note: “Multiple” refers to multiple completion events within the same well and solvent injection refers to solvent injection for enhanced oil recovery. An undefined well type is one where the primary product has not yet been determined or reported.</i>			

Table 5 details the deficiencies identified during facility inspections by BCER staff that may be related to methane emissions. Of the 438 deficiencies identified, all have been corrected.

Table 5: Summary of Deficiencies and Corrections at Facilities Inspected by BCER Staff that may be Related to Methane Emissions

Facility Type	Number of Methane-Related Deficiencies	
	Deficiencies	Deficiency Corrections
Battery Site	12	12
Compressor Dehydrator	9	9
Compressor Station	9	9
Disposal Station	1	1
Gas Dehydrator	1	1
Gas Processing Plant	4	4
Gas Sales Meter	4	4
Pipeline Gathering	1	1
Processing Battery	2	2
Satellite Battery	3	3
Water Hub	1	1
Well Facility	391	391
Total	438	438
<i>Note: Deficiency means alleged non-compliance under the BCER's inspection framework. Methane-related deficiencies include deficiencies that are or might be related to methane.</i>		

Table 6 details the deficiencies identified during well inspections by BCER staff that may be related to methane emissions. Of the 1,173 deficiencies identified, all have been corrected.

Table 6: Summary of Deficiencies and Corrections at Wells Inspected by BCER Staff that may be Related to Methane Emissions

Well Type	Number of Methane-Related Deficiencies	
	Deficiencies	Deficiency Corrections
Gas	1,104	1,104
Multiple Gas	29	29
Mutiple Oil and Gas	0	0
Multiple Oil	0	0
Oil	18	18
Undefined	19	19
Water	3	3
Total	1,173	1,173
<i>Note:</i> “Multiple” refers to multiple completion events within the same well. The number does not match the number above because multiple wells can be associated with each well facility. An undefined well type is one where the primary product has not yet been determined or reported. Deficiency means alleged non-compliance under the BCER’s inspection framework. Methane-related deficiencies include deficiencies that are or might be related to methane.		

5.3: Industry Compliance Data Based on Analysis of LDAR Submission Data

5.3.1: Survey Methods Conducted by Industry

Table 7 details the LDAR surveys conducted by industry at facilities in 2021. Overall, 1,364 surveys were conducted with 1,360 (99.7 per cent) of them involving the use of OGI technology. Surveys that involve the use of OGI technology are termed “comprehensive surveys” and those that do not involve the use of OGI technology are termed “screening surveys” (these use one or both of the following methods: a soap solution bubble test; the senses of hearing, sight, and smell).

Table 7: Summary of LDAR Surveys at Facilities

Facility Type	Number of LDAR Surveys		
	Total Surveys	Comprehensive Surveys (OGI-based)	Screening Surveys (No OGI)
Battery Site	210	210	0
Compressor Dehydrator	310	310	0
Compressor Station	164	160	4
Disposal Station	40	40	0
Gas Dehydrator	8	8	0
Gas Processing Plant	190	190	0
Gas Sales Meter	59	59	0
Injection Station	5	5	0
Natural Gas Liquids Fractionation Facility	3	3	0
Oil Sales Meter	37	37	0
Pipeline Equipment	Not Applicable	Not Applicable	Not Applicable
Pipeline Gathering	Not Applicable	Not Applicable	Not Applicable
Processing Battery	98	98	0
Pump Station	Not Applicable	Not Applicable	Not Applicable
Satellite Battery	215	215	0
Tank Terminal	10	10	0
Test Facility	Not Applicable	Not Applicable	Not Applicable
Water Hub	15	15	0
Well Facility	Not Applicable	Not Applicable	Not Applicable
Total	1,364	1,360	4

Table 8 details the LDAR surveys conducted by industry at wells in 2021 based on well fluid type. Overall, 8,818 surveys were conducted with 5,914 (69 per cent) of them involving the use of OGI technology. Surveys that use OGI technology are comprehensive surveys and those that do not use OGI technology are screening surveys.

Table 8: Summary of LDAR Surveys at Wells

Well Type	Number of LDAR Surveys		
	Total Overall Surveys	Comprehensive Surveys (OGI-based)	Screening Surveys (No OGI)
Acid Gas	2	0	2
Gas	7,401	5,330	2,071
Multiple Gas	597	190	407
Multiple Oil and Gas	2	0	2
Multiple Oil	134	119	15
Oil	523	232	291
Solvent Injection	0	0	0
Undefined	33	20	13
Water	126	23	103
Total	8,818	5,914	2,904
<i>Note:</i> “Multiple” refers to multiple completion events within the same well and solvent injection refers to solvent injection for enhanced oil recovery. An undefined well type is one where the primary product has not yet been determined or reported.			

5.3.2: Leak Detection and Repair Data

Table 9 summarizes leaks detected and their repair status at facilities, at the time of the 2021 data submission. In total, 4,094 leaks were identified, and 3,017 (74 per cent) of the detected leaks were reported as repaired at the time of data reporting. The regulation requires leaks found at facilities to be repaired within 30 days, unless the facility must be shut down to complete the repair, in which case the repair must be completed at the next turnaround. In general, repair rates were higher at smaller facilities (batteries 90 per cent) and lower at larger more complex facilities (gas processing plants 70 per cent) which are more likely to require facility shutdowns to complete repairs. Of note, 47 leaks were allocated to oil sales meters. Oil sales meters have no methane leak potential as they contain treated oil. These leaks would have been misreported from a co-located¹ facility such as a processing battery.



¹ A co-located well or facility refers to a well or facility that shares the same site as one or more other wells or facilities.

Table 9: Summary of Leak Detection and Repairs at Facilities

Facility Type	2021		
	Number of Leaks Identified	Number of Leak Repairs Completed at the Time of Reporting	Number of Leak Repairs Not Completed at the Time of Reporting
Battery Site	134	121	13
Compressor Dehydrator	1,063	839	224
Compressor Station	429	315	114
Disposal Station	33	32	1
Gas Dehydrator	0	0	0
Gas Processing Plant	2,153	1,503	650
Gas Sales Meter	5	5	0
Injection Station	2	2	0
Natural Gas Liquids Fractionation Facility	24	20	4
Oil Sales Meter	47	22	25
Pipeline Equipment	Not Applicable	Not Applicable	Not Applicable
Pipeline Gathering	Not Applicable	Not Applicable	Not Applicable
Processing Battery	161	119	42
Pump Station	Not Applicable	Not Applicable	Not Applicable
Satellite Battery	31	31	0
Tank Terminal	12	8	4
Test Facility	Not Applicable	Not Applicable	Not Applicable
Water Hub	0	0	0
Well Facility	Not Applicable	Not Applicable	Not Applicable
Total	4,094	3,017	1,077
Note: All leaks reported are included in the counts, regardless of their methane content.			

Table 10 summarizes leaks detected and their repair status at wells, at the time of the 2021 data submission. In total, 1,362 leaks were identified, and 980 (72 per cent) of the detected leaks were reported as repaired at the time of data reporting. Repair rates for 2021 are not comparable to 2020 data due to differences in timing of the reporting. Leak repair reporting for 2020 is effective as of Nov. 19, 2021, whereas 2021 leak repair reporting is effective as of the date of LDAR data submission, which generally occurred between March and June of 2022. The regulation requires leaks found at wells to be repaired within 30 days. Some leaks reported at wells will be associated with facility permits and are subject to the regulatory requirements for facility leak repairs. An assessment of compliance with leak repair timing requires a detailed audit and potentially a site inspection to assess the location and nature of the leak and operational considerations for its repair.

Table 10: Summary of Leak Detection and Repairs at Wells

Well Type	2021		
	Total Surveys	Comprehensive Surveys	Screening Surveys
Acid Gas	0	0	0
Gas	1,218	876	342
Multiple Gas	61	54	7
Multiple Oil and Gas	0	0	0
Multiple Oil	2	2	0
Oil	76	45	31
Solvent Injection	0	0	0
Undefined	5	3	2
Water	0	0	0
Total	1,362	980	382
<i>Note: “Multiple” refers to multiple completion events within the same well and solvent injection refers to solvent injection for enhanced oil recovery. An undefined well type is one where the primary product has not yet been determined or reported. All leaks reported are included in the counts, regardless of their methane content.</i>			

5.3.3: LDAR Data Analysis

Table 11 summarizes the likelihood of a leak being detected during a survey, average leak volume per survey and proportion of leaks for each facility type. Gas processing plants and compressor dehydrator facilities account for 85 per cent of the total leak volume detected. Leaks were detected during 82 per cent of surveys of compressor dehydrator facility surveys and 87 per cent of gas processing plant surveys. The results suggest continued focus on these facilities has the greatest potential to reduce fugitive emissions and confirms these facility types should continue to require more frequent LDAR surveys.

Table 11: Summary of Leak Detection Frequency and Volumes at Facilities

Facility Type	2021		
	Proportion of Surveys With Leaks Detected (%)	Average Volume of Leaks Detected per Survey (m ³ /h)	Proportion of Total Facility Leak Volume (%)*
Battery Site	28	0.2	<u>2</u>
Compressor Dehydrator	82	2.2	<u>32</u>
Compressor Station	67	0.7	<u>5</u>
Disposal Station	23	0.4	<u>1</u>
Gas Dehydrator	0	0	<u>0</u>
Gas Processing Plant	87	5.8	<u>53</u>
Gas Sales Meter	7	0.6	<u>0</u>
Injection Station	20	<0.1	<u>0</u>
Natural Gas Liquids Fractionation Facility	100	4.1	<u>0</u>
Oil Sales Meter	8	0.4	<u>1</u>
Processing Battery	54	0.9	<u>4</u>
Satellite Battery	9	<0.1	<u>0</u>
Tank Terminal	30	0.8	<u>0</u>
Water Hub	0	0	<u>0</u>
*Total may not add to 100 per cent due to rounding.			

5.3.4: Survey Number and Timing Requirements

For 2021 LDAR surveys, the compliance review addressed two focus areas:

1. Assessing survey completion and operational status for each well and facility listed as having active status.
2. Assessing compliance with the required number of surveys and minimum survey spacing for natural gas processing plants. These facilities require three LDAR surveys per year.

For focus area 1, assessing compliance with completing at least one survey at each active well or facility included consideration of the following:

- Paper and Alberta facilities – these facilities codes are created for production accounting purposes and do not correspond to physical facilities in B.C.
- Inactive, suspended or removed facilities – these facilities may have active status in the BCER database if the permit holder has not submitted a notice to demonstrate they are inactive and to update their operational status. These facilities were identified based on discussions with permit holders, BCER inspection information and a map review of connected wells, facilities and pipelines. For example, a facility with an active status that is associated with one or more decommissioned wells can be considered inactive.
- Well production data – monthly production reporting data for wells.
- Co-located wells and facilities – survey reporting may be missed for one or more wells or facilities if there are multiple wells or facilities located on a site. This issue is most prevalent on large, multi-well pads that straddle multiple surface coordinates such that all the wells or facilities on the site don't share the same NTS (National Topographic System) or DLS (Dominion Land Survey) location as applicable. These wells and facilities are identified by reviewing site identifiers and through discussions with permit holders.
- Identification of facilities that did not meet the minimum activity threshold to require an LDAR survey. These could only be identified through discussions with the permit holder.

The review determined 90 per cent of facilities and 92 per cent of wells that required at least one LDAR survey were surveyed in 2021. The BCER has initiated seven investigations of permit holders with non-compliances in completing LDAR surveys.

Common reasons for not completing required surveys were as follows:

- Asset sale during the survey year – failure to coordinate with the previous owner or to communicate new assets with the LDAR service provider.
- Contract operator – lack of coordination between LDAR service provider and contract operator to ensure LDAR surveys are completed.
- Failure to survey wells or facilities that initiated production or were reactivated part way through the year.
- Access limitations at the time of survey. No follow up when access has improved.

For focus area 2, assessing compliance with completing the required number of surveys and survey spacing for gas processing plants included consideration of the following:

- Alberta facilities – these facilities process natural gas produced in B.C. and are assigned facility codes for production reporting purposes.
- Inactive, suspended and removed facilities – as noted in item 1.
- Production data–gas processing plants submit monthly production reports. This information can be used to identify inactive facilities and partially inactive facilities for prorating LDAR surveys.

The review determined that 199 surveys were required at 67 operating gas processing plants and 186 compliant surveys were completed for an overall compliance rate of 93 per cent.

Non-compliance included seven required surveys that were not completed and six surveys that did not meet the minimum spacing requirement of 60 days between surveys. For surveys which did not meet the minimum spacing requirement, the average time between surveys was 46 days.

5.3.5: Leak Repairs

Assessing compliance with repair timelines is a complex task that includes confirming identified leaks are correctly attributed to well or facility permits. In the case of leaks associated with a facility permit, assessing compliance must consider if repair of the leak requires shutdown of the facility or not.

It is anticipated assessing compliance with leak repair timelines will be an area of focus for 2022 LDAR surveys.

5.4: Surface Casing Vent Flows

There were eight wells with surface casing vent flows that exceed the emissions threshold of 100 m³/d and were either reported prior to 2021 or during 2021.

1. Five wells with a combined flow rate of 5,361 m³/d have implemented mitigations to eliminate venting.
2. One well with a flow rate of 155 m³/d has been repaired and is undergoing final decommissioning.
3. One well with a flow rate of 110 m³/d is undergoing permitting and facility modifications to tie the vent flow into production.

4. One well with a flow rate of 130 m³/d is currently non-compliant. An order has been issued to develop and submit an action plan by Jan. 31, 2023 to address the vent flow.

5.5: New Equipment Installations

Compliance for new equipment installations including new compressors, new pneumatic pumps and pneumatic devices at new facilities is assessed through the facility permitting process, facility startup inspections and through compliance reviews of as-built drawings. This process ensures compliance at the time of facility startup. In 2021, the BCER issued 29 new facility permits and 94 facility permit amendments.



6. Continuous Improvement

6.1: Data Improvements and eSubmission System Modifications

Key challenges in tracking LDAR compliance include facility status and licensing discrepancies and tracking and reporting LDAR surveys at co-located sites (sites containing multiple wells and facilities). To address these challenges, the BCER is undertaking an initiative to review and update the status of facilities and is developing tools to provide site level information to permit holders for survey tracking and reporting. In the longer term, the BCER is working towards changes to the eSubmission system to report and track surveys at the site level.

6.2: Regulatory Review

The BCER completed a regulatory review of methane regulations in 2022. The review found the Province is on track to meet the 2025 methane emissions target and, therefore, focused on changes intended to provide clarity and improve the administration of the regulation. The proposed changes include:

- Requiring LDAR surveys to be completed at the site level instead of the permit level. These will improve tracking and reporting of LDAR surveys at sites that include multiple well or facility permits.
- Updating LDAR survey requirements for batteries, so they are based on facility type only. This simplifies survey requirements by removing consideration of storage tanks and single-well vs. multi-well batteries.
- Incorporating provisions into regulation that were previously in guidance, including data collection and reporting requirements and LDAR survey proration.
- Increasing the stringency of requirements to repair leaks detected during LDAR surveys.
- Added requirements for continuous monitoring or inspection of flares to reduce emissions associated with unlit flares.
- Various updates to improve clarity, including new definitions, removal of effective dates no longer required and redrafting of the section on compressor emissions.

The BCER anticipates the proposed changes will be implemented in early 2023. In accordance with the equivalency agreement, the text of all regulatory changes associated with methane emissions will be shared with Environment and Climate Change Canada, prior to implementation.

6.3 Compliance Awareness and Promotion

In 2023, the BCER will continue to update technical guidance to clarify regulatory requirements and issue technical updates as needed. As there is now a high awareness in industry of methane regulatory requirements and they have been in effect for a few years, the BCER will focus more on compliance activities and escalating enforcement where there is continued non-compliance.

6. Continuous Improvement

6.4: Oil and Gas Royalty System Changes

In 2022, B.C. introduced a new oil and gas royalty system, effective Sept. 1, 2022. The new royalty system eliminates existing royalty credit programs including the Marginal Well Royalty Program, Ultramarginal Royalty Program and the Low Productivity Royalty Program. Elimination of these programs is expected to accelerate the closure of existing low productivity, legacy wells and facilities with higher emissions intensities.

Beginning in 2023 and ending in 2026, producers will be given opportunities to transfer unused deep well royalty deductions to an emissions reduction fund to assist with funding for emissions reduction projects that exceed regulatory requirements.



7. Exemption Requests

Permit holders can apply for exemptions to specific requirements of DPR section 41.1 under DPR section 4. A summary of the exemption requests received to date and their approval status is provided in Table 12. Two requests for exemptions to leak repair timing windows were received in 2022 and both were granted.

Table 12: Exemptions Summary

Summary of Request	Decision
Extension to fugitive emissions leak repair timeline to determine a better repair approach to stop recurring leaks. Impacts 5 Pressure/Vacuum Relief Valves with a combined leak rate of 2.2 m3/h.	Granted
Extension to fugitive emissions leak repair timeline to order parts. Impacts one pressure switch with a leak rate of 0.03 m3/h.	Granted



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