# Equivalency Report | 2022

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

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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 <u>final</u> order under section 10(3) of the <u>Canadian</u> <u>Environmental Protection Act</u> (CEPA). As a result, the following federal regulations no longer apply in British Columbia (B.C.): <u>Regulations Respecting Reduction in the</u> <u>Release of Methane and Certain Volatile</u> <u>Organic Compounds (Upstream Oil and Gas</u> Sector).

Under the Equivalency Agreement, the provincial methane regulations, which were introduced in December 2018 through amendments to the <u>Drilling and Production</u> <u>Regulation</u> (DPR) under the <u>Energy Resource</u> <u>Activities Act</u> (ERAA), 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 most recent Provincial Greenhouse Gas (GHG) Emissions Inventory indicates B.C. is on track to meet its 2025 methane emissions reduction target before 2025.

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 pumps and devices, compressor seals, glycol dehydrators, storage tanks and surface casing vents. In 2022, the BC Energy Regulator (BCER) completed a review of the provincial methane regulations for efficiency and effectiveness. The review concluded B.C. is on track to meet or exceed the 2025 methane emissions reduction target. Based on the review, targeted changes to the regulations were completed to enhance monitoring of flare stacks, align leak detection survey requirements with the potential for fugitive emissions at facilities and improve administration of the regulation. The amendments, effective Jan. 1, 2024, will result in additional reductions in methane emissions.

# 2. Summary of Reporting Obligations under the Equivalency Agreement

Section 3 of the Equivalency Agreement requires B.C. to provide Canada, on an annual basis, with information representing the previous year by no later than December 31st of each year. This document reflects reporting obligations under the Equivalency Agreement for the 2022 calendar year. Submission of the following information is required:

- 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 CO<sub>2</sub>e), 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

#### **Facility Counts**

Table 1 shows the overall number of natural gas and oil facilities in B.C. by year, disaggregated by facility status. Further to the explanatory notes provided, the number of permitted facilities increased by 36 and there were 465 facility closures from 2021 to 2022. From 2022 to 2023, the number of permitted facilities increased by 48 and there were 357 facility closures.

The data summarized in Table 1, and subsequent tables in this report, are for January 31st of each year, to ensure consistent reporting of data.

Many facilities listed as "Active" status are 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

	Number of Facilities		
Facility Status	2023	2022	2021
Active	6,680	6,974	7,319
Cancelled	12,141	12,118	12,087
Construction Complete	19	20	21
Inactive	802	750	793
Permit Approved	295	283	349
Removed	2,373	2,152	1,710
Suspended	1,312	1,251	1,216
Under Construction	45	71	88
Total	23,667	23,619	23,583

*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. Facilities with one of these statuses do not require 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, facilities with one of these statuses do not require 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.



#### **Well Counts**

Table 2 shows the overall number of wells in B.C. as of January 1st of each year, disaggregated by well status. Further to the explanatory notes, the number of well authorizations increased by 243 and there were 272 well closures from 2021 to 2022. From 2022 to 2023, the number of well authorizations increased by 474 and there were 89 well closures.

Higher natural gas prices in 2022 likely prolonged the life of some wells, reducing the number of wells moving from active to inactive status. Please note Well and Facility Statuses, as shown in Tables 1 and 2, are updated retroactively in the BCER databases so the counts are reflective of the moment the data is extracted from the database. The data in the tables were extracted on or about Sept. 5, 2023.

#### Table 2. Summary of Well Status

	Number of Wells		
well Status	2023 2022 2021		
Abandoned	10,235	9,624	8,783
Active	10,478	10,152	9,930
Cancelled	5,840	5,818	5,788
Inactive	1,244	2,077	1,765
Suspended	5,234	4,945	5,856
Under Development	187	196	217
Well Authorized	2,616	2,548	2,778
Total	35,834	35,360	35,117
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*Note:* 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 do not require LDAR surveys because they are no longer operating, never existed or no longer exist. New wells include "Under Development" and "Well Authorized". As they are not operating yet, wells with one of these statuses do not require LDAR surveys.

# 4. Part B: Implementation and Effectiveness

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 or decommissioning of the well, production, combustion or installation and monitoring of a burst plate or pressure safety valve.

Implementation of LDAR requirements is 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.

Compliance with venting requirements, including those associated with pneumatic devices and pumps, compressor seals and storage tanks, are addressed through targeted audits. In 2023, the BCER completed its first venting emissions audits.

The Province measures the effectiveness of its regulation through an oil and gas methane emissions modeling framework and the Provincial GHG Emissions Inventory. The Provincial modeling framework is comparable to the federal methodology outlined in the Environment and Climate Change Canada document Upstream Oil and Gas Fugitive Emissions Model, Methodology and Documentation, while incorporating data from recent measurement informed methane emission inventory research conducted in B.C. The Provincial GHG Emissions Inventory is largely based on the National Inventory Report produced by the federal government, which includes emissions data nearly two years old.

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In 2023, the Provincial modeling framework was updated to align with information gathered using airborne remote sensing measurements, operator reported LDAR data and the approved changes to the DPR methane emission regulations taking effect Jan. 1, 2024. The Province's modeling framework suggests B.C. will exceed the 45 per cent reduction target by 2025 under the current regulatory framework, in line with federal expectations. The most recent data from the Provincial 2021 GHG Emissions Inventory report shows methane emissions from the oil and gas sector have decreased by 47 per cent from 2014 to 2021.

The BCER approved changes to the DPR methane emissions regulations taking effect on Jan. 1, 2024. These changes were 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 LDAR surveys from guidance to regulation. As 2022 was the third year the regulations were in effect, the BCER has generally shifted from a focus on compliance awareness and promotion, to a focus on compliance assessment. Section 5 of this report contains details on specific compliance activities.

Additional analysis of 2022 LDAR data collected has also been conducted. The results, which are shared in Table 11, show that gas processing plants and compressor dehydrator facilities account for 82 per cent of the total leak volume detected at facilities. 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 compared to well sites.

In 2022 and 2023, the BC Oil and Gas Methane Emissions Research Collaborative (MERC) completed their existing research projects and developed an updated research plan and has begun to solicit proposals on new research in late 2023 and early 2024. Additional information on completed projects can be found on the BC Oil and Gas Research and Innovation Society website (www.bcogris.ca).

Building on the research completed through the MERC, the Province is supporting additional studies to identify and measure methane emission sources from the oil and gas sector.



The Province is co-funding a study, along with the UN Environment Programme International Methane Emissions Observatory, to advance world leading measurement research done through Carleton University's Energy and Emissions Research Lab, including aerial remote sensing surveys across the oil and gas sector and a large-scale ground measurement survey to complement the aerial data. This work adds insights into individual methane sources that are critical to policy development and achieving B.C.'s methane reduction targets.

B.C. is also funding a study with GHGSat to monitor provincial methane concentrations and detect large, so-called "super-emitter" methane sources in the province. Superemitter sources have been shown to have a significant contribution to oil and gas methane emissions, so much so that the United States Environmental Protection Agency is launching a Super-Emitter Program to address these sources. Large emission sources are not expected to be numerous in the province based on the specifics of the oil and gas sector compared to other regions; however, the continued monitoring allows B.C. to confirm that assumption and continue to improve its methane emission understanding.



# 5. Part C: Compliance and Enforcement

### **5.1. Overview of BCER LDAR Compliance Framework**

# 5.1.1. Compliance Awareness and Promotion

The BCER has encouraged compliance awareness and promotion in the following manner:

- Stakeholder consultation activities related to the development and review of the regulations.
- 2. BCER methane webpage materials, technical guidance and information updates.
- 3. Direct engagement with permit holders on permit applications, data submission, inspections and audits.

# 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 noncompliances 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 1).



Figure 1. Graduated non-compliance management model

### 5.1.3. LDAR Submission Compliance Review

In addition to inspections, the BCER conducted an administrative review with respect to industry compliance of LDAR reporting requirements. Following the review, the BCER followed up directly with permit holders that had missing submissions. For 2022 LDAR surveys, the compliance review focused on the following areas:

- Assessing survey completion and operational status for each well and facility that is listed as having "Active" status.
- 2. Assessing compliance with the required number of surveys and minimum survey spacing for natural gas processing plants.
- 3. Assessing compliance with leak repair timelines.

Based on the findings of the compliance reviews, the BCER has issued two orders and initiated five enforcement investigations. The enforcement investigations are currently in progress. An enforcement investigation may result in a statutory enforcement decision or action (Figure 1) depending on the outcome of the investigation.

### **5.2. Inspections Data**

Table 3. Number of Facilities Inspected by BCER Staff in 2022

Table 3 details the number of facilities inspected by BCER staff in 2022. Overall, 3,796 facilities were inspected. 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.

Facility Type	Number Inspected
Battery Site	196
Compressor Dehydrator	103
Compressor Station	86
Disposal Station	36
Gas Dehydrator	23
Gas Processing Plant	28
Gas Sales Meter	82
Injection Station	15
NGL Fractionation Facility	1
Oil Sales Meter	20
Pipeline Gathering	3
Processing Battery	33
Pump Station	2
Satellite Battery	99
Tank Terminal	5
Test Facility	15
Water Hub	15
Well Facility	3,034
Total	3,796

Table 4 shows the number of wells inspected by BCER staff in 2022. In total, 7,188 inspections of wells were completed.

#### Table 4. Number of Wells Inspected by BCER Staff in 2022

Well Type	Number Inspected	
Acid Gas	12	
Gas	4,962	
Multiple Gas	477	
Multiple Oil and Gas	20	
Multiple Oil	85	
Oil	813	
Solvent Injection	0	
Undefined	506	
Water	313	
Total	7,188	
<i>Note:</i> "Multiple" refers to multiple completion events within the same		

*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. Table 5 details the number of deficiencies issued at facilities that may be related to methane emissions. Of the 327 deficiencies identified, all have been corrected.

Table 5. Summary of Deficiencies Issued at Facilities that may be Related to Methane Emissions in 2022

	Number of Potential Methane-Related Deficiencies		
Facility Type	Deficiencies	Deficiency Corrections	
Battery Site	22	22	
Compressor Dehydrator	7	7	
Compressor Station	11	11	
Disposal Station	2	2	
Gas Dehydrator	0	0	
Gas Processing Plant	0	0	
Gas Sales Meter	5	5	
Injection Station	3	3	
Oil Sales Meter	1	1	
Pipeline Gathering	0	0	
Processing Battery	4	4	
Satellite Battery	4	4	
Water Hub	1	1	
Well Facility	267	267	
Total	327	327	
<i>Note:</i> "Deficiency" means alleged non-compliance under the BCER's inspection framework. Methane-related deficiencies include deficiencies that are or might be related to methane.			

Table 6 details the deficiencies issued at wells that may be related to methane emissions. Of the 684 deficiencies identified, all have been corrected.

Well Ture	Number of Potential Meth	ane-Related Deficiencies	
weit Type	Deficiencies Deficiency Corrections		
Gas	579	579	
Multiple Gas	30	30	
Multiple Oil and Gas	0	0	
Multiple Oil	1	1	
Oil	17	17	
Undefined	44	44	
Water	13	13	
Total	684	684	

Table 6. Summary of Deficiencies Issued at Wells that may be Related to Methane Emissions in 2022

Note: "Multiple" refers to multiple completion events within the same well.

The number of deficiencies does not match the number of deficiencies from well facilities in Table 5 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 reported by industry at facilities in 2022. Overall, 1,417 surveys were reported with all of the surveys using Optical Gas Imaging (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" which use the following methods: a soap solution bubble test and/or the senses of hearing, sight and smell.

#### Table 7. Summary of LDAR Surveys at Facilities

	Number of LDAR Surveys		
Facility Type	Total Surveys	Comprehensive Surveys (OGI-based)	Screening Surveys (No OGI)
Battery Site	182	182	0
Compressor Dehydrator	335	335	0
Compressor Station	179	179	0
Disposal Station	34	34	0
Gas Dehydrator	10	10	0
Gas Processing Plant	196	196	0
Gas Sales Meter	79	79	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	103	103	0
Pump Station	Not Applicable	Not Applicable	Not Applicable
Satellite Battery	228	228	0
Tank Terminal	10	10	0
Test Facility	Not Applicable	Not Applicable	Not Applicable
Water Hub	16	16	0
Well Facility	Not Applicable	Not Applicable	Not Applicable
Total	1,417	1,417	0

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Table 8 details the LDAR surveys reported by industry at wells in 2022 based on well fluid type. Overall, 9,536 surveys were reported with 6,752 (71 per cent) of them involving the use of OGI technology.

#### Table 8. Summary of LDAR Surveys at Wells

	Number of LDAR Surveys		
Well Type	Total Overall Surveys	Comprehensive Surveys (OGI-based)	Screening Surveys (No OGI)
Acid Gas	0	0	0
Gas	7,924	5,978	1,946
Multiple Gas	645	247	398
Multiple Oil and Gas	2	0	2
Multiple Oil	161	141	20
Oil	660	334	326
Solvent Injection	0	0	0
Undefined	30	28	2
Water	114	24	90
Total	9,536	6,752	2,784

*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.

## 5.3.2. Leak Detection and Repair Data

Table 9 summarizes leaks detected and their repair status at facilities, at the time of the 2022 data submission. In total, 4,587 leaks were identified and 3,614 (79 per cent) of the detected leaks were reported as repaired at the time of data reporting. Leak repair rates at the time of reporting increased from 74 per cent in 2021 to 79 per cent in 2022. 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 93 per cent) and lower at larger more complex facilities (gas processing plants 76 per cent) that are more likely to require facility shutdowns to complete repairs.

Facility Type	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	222	206	16
Compressor Dehydrator	1,105	851	254
Compressor Station	510	399	111
Disposal Station	64	64	0
Gas Dehydrator	4	3	1
Gas Processing Plant	2,158	1,634	524
Gas Sales Meter	5	5	0
Injection Station	5	5	0
Natural Gas Liquids Fractionation Facility	16	15	1
Oil Sales Meter	14	9	5
Pipeline Equipment	Not Applicable	Not Applicable	Not Applicable
Pipeline Gathering	Not Applicable	Not Applicable	Not Applicable
Processing Battery	197	170	27
Pump Station	Not Applicable	Not Applicable	Not Applicable
Satellite Battery	40	37	3
Tank Terminal	7	4	3
Test Facility	Not Applicable	Not Applicable	Not Applicable
Water Hub	5	4	1
Well Facility	235	208	27
Total	4,587	3,614	973

Table 9. Summary of Leak Detection and Repairs at Facilities in 2022

19 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 2022 data submission. In total, 2,038 leaks were identified, and 1,848 (91 per cent) of the detected leaks were reported as repaired at the time of data reporting. Repair rates at the time of reporting increased from 72 per cent in 2021 to 91 per cent in 2022. The regulation requires leaks found at wells to be repaired within 30 days. Some leaks reported at wells may 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.

Well Type	Number of Leaks Identified	Number of Leak Repairs Completed	Number of Leak Repairs Not Completed
Acid Gas	0	0	0
Gas	1,851	1,679	172
Multiple Gas	139	125	14
Multiple Oil and Gas	0	0	0
Multiple Oil	1	1	0
Oil	45	41	4
Solvent Injection	0	0	0
Undefined	2	2	0
Water	0	0	0
Total	2,038	1,848	190

Table 10. Summary of Leak Detection and Repairs at Wells in 2022

*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.

A review of leak repair rates and timelines shows there are significant variations between permit holders with respect to the percentage of leaks reported as repaired and median leak repair timelines.

For facilities, top performing permit holders had repaired greater than 85 per cent of leaks detected at the time of reporting and had a median repair timeline of less than 30 days.

For wells, top performing permit holders had repaired 100 per cent of leaks detected at the time of reporting and had a median repair timeline of less than 15 days.

### 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. Five facility types accounted for 97 per cent of fugitive emissions from facilities: gas processing plant, compressor dehydrator, compressor station, battery and processing battery.

Leaks associated with storage tanks were the dominant leak source, accounting for 58 per cent of the total volume of leaks that were detected at facilities in 2022.

Facility Type	Proportion of Surveys With Leaks Detected (%)	Average Volume of Leaks Detected per Survey (m <sup>3</sup> /h)	Proportion of Total Facility Leak Volume (%)*			
Battery Site	28	0.6	5			
Compressor Dehydrator	65	2.1	33			
Compressor Station	64	0.7	6			
Disposal Station	35	0.2	<1			
Gas Dehydrator	20	<0.1	<1			
Gas Processing Plant	74	5.4	50			
Gas Sales Meter	5	<0.1	<1			
Injection Station	20	<0.1	<1			
Natural Gas Liquids Fractionation Facility	100	1.9	<1			
Oil Sales Meter	14	0.4	<1			
Processing Battery	55	0.6	3			
Pump Station	0	0	<1			
Satellite Battery	11	<0.1	<1			
Tank Terminal	40	0.2	<1			
Water Hub	31	0.5	<1			
*Total may not add to 100 per cent due to rounding.						

#### Table 11. Summary of Leak Detection Frequency and Volumes at Facilities in 2022



### 5.3.4. Survey Number and Timing Requirements

The compliance review addressed two focus areas:

- Assessing survey completion and operational status for each well and facility that is listed as having active status; and
- 2. Assessing compliance with the required number of surveys and minimum survey interval 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 that 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 that 98 per cent of facilities and 96 per cent of wells that required at least one LDAR survey were surveyed in 2022. The BCER has initiated five 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 that LDAR surveys are completed.
- Failure to survey wells or facilities that initiated production or were reactivated partway through the year.
- Access limitations at the time of survey. No follow-up when access has improved.
- Well or facility shut in prior to completion of required survey.

For focus area 2, assessing compliance with completing the required number of surveys 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 five required surveys were not completed for an overall compliance rate of 98 per cent.

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### 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.

Table 12 summarizes leak repair data for well and facility surveys for 2021 and 2022. From 2021 to 2022, the percentage of leaks reported as repaired at the time of LDAR data reporting increased for both wells and facilities. For leaks reported as repaired, the median timeline to repair a leak decreased for both wells and facilities from 2021 to 2022.

Follow-up with permit holders is ongoing at the time of reporting, with a focus on addressing permit holders with the lowest performance with respect to repair rates and timelines.

#### Table 12. Summary of Leak Repairs

	Leaks Repaired at time of Reporting (%)		Median Leak Repair Time (days)	
	2021	2022	2021	2022
Wells	72	91	10	6
Facilities	74	79	26	22

### **5.4. Surface Casing Vent Flows**

There were six wells with surface casing vent flows that exceed the emissions threshold of 100 m3/d reported in 2022:

- Three wells have implemented mitigations to eliminate venting.
- Two wells have been repaired.
- One well is in the process of repair and final decommissioning.

### **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 2022, the BCER approved 71 new facility permits and 110 facility permit amendments.

### 5.6. Venting Compliance Audit

In 2022, the BCER completed a venting compliance audit that focused on compliance with emissions requirements for pneumatic devices, reciprocating compressor seals and uncontrolled storage tanks. The audit included 19 permit holders which assessed compliance at:

- Two gas processing plants.
- Eight compressor stations.
- 10 batteries.
- 170 unconventional wells.
- 42 conventional wells.

The audit identified one permit holder had not completed required compressor seal tests. The remaining permit holders were fully compliant with individual and fleet average emissions limits for compressor seals. The BCER has initiated an enforcement investigation for the non-compliant permit holder.

None of the sites contained uncontrolled storage tanks that were in service.

For pneumatic devices:

- 48 per cent of sites had non-emitting devices.
- 177 compliant low-bleed devices were identified.
- Five non-compliant high bleed devices were identified. These devices were associated with two permit holders. Three of the five devices have been addressed. The remaining two devices are in a winter access area and have been shut in due to wildfire activity. These sites will be addressed in winter 2023/24.
- None of the permit holders indicated that they were operating high bleed pneumatic devices under the safety exception set out in section 25.05(4)(b) of the DPR.





# 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. These changes will be implemented with the 2024 regulatory amendments.

# 6.2. Compliance Awareness and Promotion

The BCER continues to update technical guidance to clarify regulatory requirements and issue technical updates, as needed. As there is now a high awareness of methane regulatory requirements, which have been in effect for a few years, the BCER will focus more on compliance activities and escalating enforcement where there is continued noncompliance.

# 6.3. Oil and Gas Royalty System Changes

The Province announced a new oil and gas royalty framework in May 2022 that balances B.C.'s goals for economic development, a fair return on natural resources and environmental protection. The transition to the new royalty framework takes place from Sept. 1, 2022 to Aug. 31, 2024, after which all wells move to the new framework. Effective Sept. 1, 2022, new wells drilling (spud) on or after that date are not eligible for the deepwell royalty program, the marginal well royalty program or the ultramarginal royalty program. Elimination of these programs is expected to accelerate the closure of existing low productivity legacy wells and facilities with higher emissions intensities.

As part of the new royalty framework, producers will be given opportunities to transfer unused deep well royalty deductions to a healing the land and 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. Three exemption requests (totaling 18 separate leaks) to leak repair timelines were received in 2022. Two of the exemptions (totaling four separate leaks) were granted.



# 8. Summary

The 2022 Equivalency Report addresses annual reporting obligations outlined in the Equivalency Agreement between Canada and British Columbia, which came into force on March 25, 2020.

Key findings and information from the 2022 report include:

- The Provincial modeling framework and the Provincial GHG Emissions Inventory indicate B.C. is on track to meet its 2025 methane emissions reduction target before 2025. The most recent data from the Provincial 2021 GHG Emissions Inventory report shows methane emissions from the oil and gas sector have decreased by 47 per cent from 2014 to 2021.
- The BCER continues to work with permit holders to update and correct the status of their well and facilities. This ongoing work has resulted in updates to well and facility status data.
- The BCER completed a venting compliance audit that focused on emissions requirements for pneumatic devices, reciprocating compressor seals and uncontrolled storage tanks. The audit included 19 permit holders.

The audit identified one permit holder that did not complete the required compressor seal tests. The BCER has initiated an enforcement investigation for the non-compliant permit holder.

- The BCER conducted an administrative review regarding industry compliance on LDAR reporting requirements. From 2021 to 2022, the percentage of leaks reported as repaired at the time of LDAR data reporting increased for both wells and facilities. For leaks reported as repaired, the median timeline to repair a leak decreased for both wells and facilities from 2021 to 2022. The BCER is following up with select permit holders to address leak repair rates and timelines.
- LDAR compliance rates have increased significantly since the first Equivalency Report due to factors including awareness and familiarity with requirements by operators, BCER submission system improvements and enhanced data review for improved accuracy in compliance estimates.
- Based on the findings of the LDAR compliance review, the BCER issued two orders and initiated five enforcement

investigations. The enforcement investigations are currently in progress. An enforcement investigation may result in a statutory enforcement decision or action, depending on the outcome of the investigation.

- Regulatory amendments to the DPR to enhance monitoring of flare stacks, align leak detection survey requirements with the potential for fugitive emissions at facilities, and improve administration of the regulation, came into effect on Jan. 1, 2024. These amendments will result in additional reductions in methane emissions.
- B.C. continues to focus on research and data collection that will drive continuous improvement, by furthering our understanding of methane emissions, emission reduction opportunities and regulatory effectiveness. This includes supporting methane emissions research through the MERC, co-funding a study to advance world leading measurement research through Carleton University's Energy and Emissions Research Lab and funding a study with GHGSat to monitor provincial methane concentrations and detect large sources of methane emissions.



# February 2024



BRITISH COLUMBIA ENERGY REGULATOR