Equivalency Report 2023

In fulfillment of reporting obligations under 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

BCER
BRITISH COLUMBIA ENERGY REGULATOR

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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 Energy Resource Activities Act (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 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 became effective Jan. 1, 2024, and will result in additional reductions in methane emissions.

In 2024, the BCER amended the provincial methane regulations in order to meet the Province's commitment to reduce methane emissions for the oil and gas sector by 75 per cent by 2030 compared to a 2014 baseline, and a near elimination of all industrial methane emissions by 2035. Leveraging provincial reporting and measurement data, the amendments focus on key areas and sources of emissions, such as compressor seals, pneumatic pumps and devices, dehydrators, surface casing vent flows, and LDAR requirements. The regulation updates will require automated monitoring systems on equipment with the highest rate of leakage, increase the number of LDAR surveys required for large facilities, tighten venting limits for certain operations, and impose stricter design and operating standards for new and modified facilities. The amendments will be phased in beginning on Jan. 1, 2025.

The data and analysis provided herein is for the 2023 reporting year, and the previous mentioned regulatory amendments were not in effect.

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 31 of each year. This document reflects reporting obligations under the Equivalency Agreement for the 2023 calendar year. Submission of the following information is required:

A. The number of existing facilities and wells 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 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 48 and there were 357 facility closures from 2022 to 2023. From 2023 to 2024, the number of permitted facilities increased by 124 and there were 133 facility closures.

As some of the "Active" facilities are inactive, suspended or removed, the BCER continues 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. The data summarized in Table 1, and subsequent tables in this report, are for January 31 of each year, to ensure consistent reporting of data.

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 Aug. 1, 2024.

Table 1. Summary of Facility Status

Facility Status	Number of Facilities		
	2024	2023	2022
Active	6,627	6,680	6,974
Cancelled	12,145	12,141	12,118
Construction Complete	20	19	20
Inactive	828	802	750
Permit Approved	300	295	283
Removed	2,507	2,373	2,152
Suspended	1,281	1,312	1,251
Under Construction	83	45	71
Total	**23,791**	**23,667**	**23,619**

Notes:

- 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 all equipment and associated piping have been removed from site.
- One facility was issued a Certificate of Reclamation and is not included in the total.

Well Counts

Table 2 shows the overall number of wells in B.C. as of January 1 of each year, disaggregated by well status. Further to the explanatory notes, the number of well authorizations increased by 474 and there were 89 well closures from 2022 to 2023. From 2023 to 2024, the number of well authorizations increased by 1,002 and there were 259 well closures.

Table 2. Summary of Well Status

Well Status	Number of Wells		
	2024	2023	2022
Abandoned	10,785	10,235	9,624
Active	10,703	10,478	10,152
Cancelled	5,870	5,840	5,818
Inactive	1,093	1,244	2,077
Suspended	5,064	5,234	4,945
Under Development	309	187	196
Well Authorized	3,012	2,616	2,548
Total	**36,836**	**35,834**	**35,360**

Notes:

- 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

4.1 Assessing implementation

Implementation of the regulatory requirements is 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 presents an immediate safety or environmental hazard, 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 and compliance with 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, is addressed through targeted audits. In 2024, the BCER completed its second venting emissions audits.

4.2 Assessing effectiveness

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's methodology is comparable to the federal methodology outlined in the Environment and Climate Change Canada (ECCC) document Upstream Oil and Gas Fugitive Emissions Model, Methodology and Documentation. It also incorporates B.C.-specific data from methane emission inventory research. The Provincial GHG Emissions Inventory is largely based on the National Inventory Report (NIR) produced by the federal government, which reports on emissions with a two-year delay.

In 2023, the Provincial modeling framework was updated to align with peer-reviewed information gathered using airborne remote sensing measurements, operator-reported LDAR data and the newest amendments to the DPR methane emission regulations. Based on this updated information, the Province's modeling framework suggests B.C. will meet the 45 per cent methane reduction target by 2025 under the current regulatory framework, in line with federal requirements.

Canada's official GHG Inventory for 2024 (NIR) reported B.C. having lower methane reductions than had been estimated in previous years' NIRs. In its Technical Overview of Changes to British Columbia's Oil and Gas Methane Emissions, though, ECCC acknowledged the 2024 NIR underestimates methane reductions in B.C. since 2014 and stated "BC has consistently been shown to have one of the lowest emissions intensities (emissions per unit of production) in Canada and internationally". B.C. and ECCC have collaborated to revise the 2024 NIR's methodological changes to better incorporate B.C.-specific data. The revised estimate will be included in NIR 2025.

4.3 Research

The BC Methane Emissions Research Collaborative (MERC) was established to reduce knowledge gaps related to methane emissions through research and information sharing. Membership includes representatives from the provincial and federal government, BCER, industry associations, Geoscience BC and environmental non-governmental organizations.

In 2024, MERC updated the three-year research plan which will inform the effectiveness and continuous improvement in B.C. methane regulations. Additional information on projects either underway or completed under the MERC 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. Measurements completed in 2021 indicate B.C.'s oil and gas sector has a methane emission intensity (i.e. methane emissions per unit of natural gas produced) between 0.38%-0.48%, well below the national measurement-informed methane intensity (1.1%-1.8%).

From early 2023 to early 2024, B.C. completed a study with GHGSat to monitor provincial methane emissions and detect large, so-called "super-emitter" methane sources in the province. In some jurisdictions, super-emitter 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 has launched a Super-Emitter Program to address these sources. Based on the specifics of B.C.'s oil and gas sector compared to those of other regions, large emission sources were not expected to be as prevalent. Results from one year of the GHGSat study suggested emissions from super-emitter sources were less numerous in B.C.'s region.

Building on the results of the research and combined with the reported data collected through the LDAR requirements, amendments to the provincial methane regulations balanced risk-based LDAR enhancements with requirements to address larger emission potential methane sources – and provided evidence in support of this expectation. B.C. strives to continually understand sources, magnitude and frequency of methane emissions. This targeted, evidence-based approach ensures B.C.'s methane emission regulations are effective and fit for purpose for the characteristics of B.C.'s oil and gas sector.

The Province continues to consider additional detection and measurement research to allow for informed reporting on progress towards targets, ensure the regulation is fit for purpose, and advance understanding of methane emissions as regulatory requirements come into effect.

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:

1. 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 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 (Fig. 1).

The BCER conducted inspections of 9,238 facilities and wells in 2023.

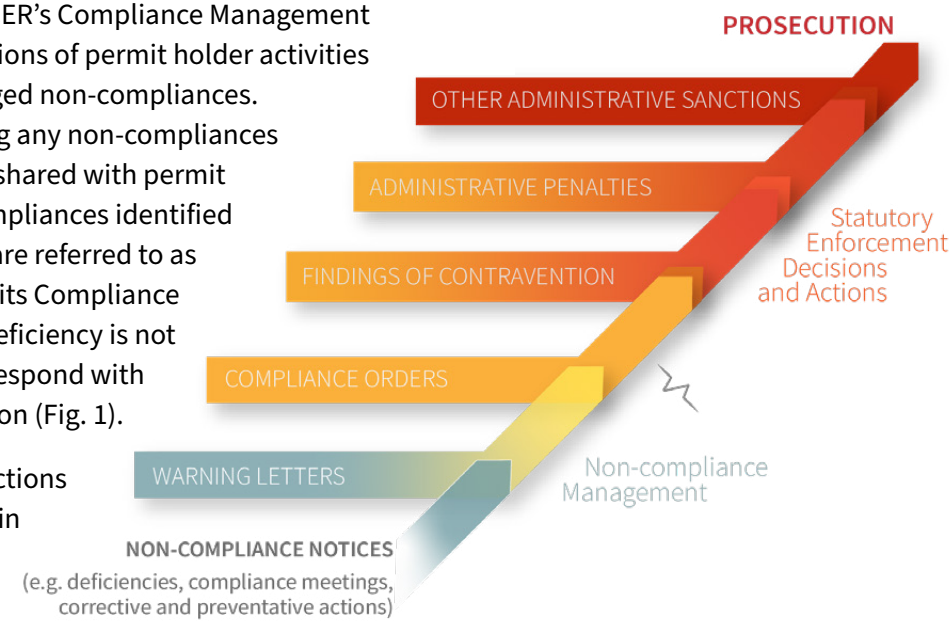


Figure 1. The BCER's graduated non-compliance management model

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 2023 LDAR surveys, the compliance review focused on the following areas:

1. 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.

In 2022, compliance reviews resulted in the BCER issuing one penalty, two orders and initiating five enforcement investigations. Four of the five investigations resulted in the issuance of Warning Letters and one investigation is on-going.

5.2. 2023 BCER Inspections Data

Table 3 details the number of facilities inspected by BCER staff in 2023. Overall, 2,957 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.

Table 3. Number of Facilities Inspected by BCER Staff in 2023

Facility Type	Number Inspected
Battery Site	81
Compressor Dehydrator	96
Compressor Station	70
Disposal Station	17
Gas Dehydrator	12
Gas Processing Plant	15
Gas Sales Meter	18
Injection Station	5
LNG Facility	3
Natural Gas Liquids Fractionation Facility	0
Oil Sales Meter	0
Processing Battery	29
Pump Station	5
Satellite Battery	52
Tank Terminal	0
Test Facility	0
Water Hub	6
Well Facility	2,548
Total	**2,957**

Table 4 shows the number of wells inspected by BCER staff in 2023. In total, 6,281 inspections of wells were completed. Inspection numbers dropped by about 16 per cent from 2022 to 2023 largely due to limited access due to wildfire activity.

Table 4. Number of Wells Inspected by BCER Staff in 2023

Well Type	Number Inspected
Acid Gas	4
Gas	4,785
Multiple Gas	398
Multiple Oil and Gas	34
Multiple Oil	15
Oil	470
Undefined	435
Water	140
Total	**6,281**

Notes:
- "Multiple" refers to multiple completion events within the same well.
- An undefined well type is one where the primary product has not yet been determined or reported.

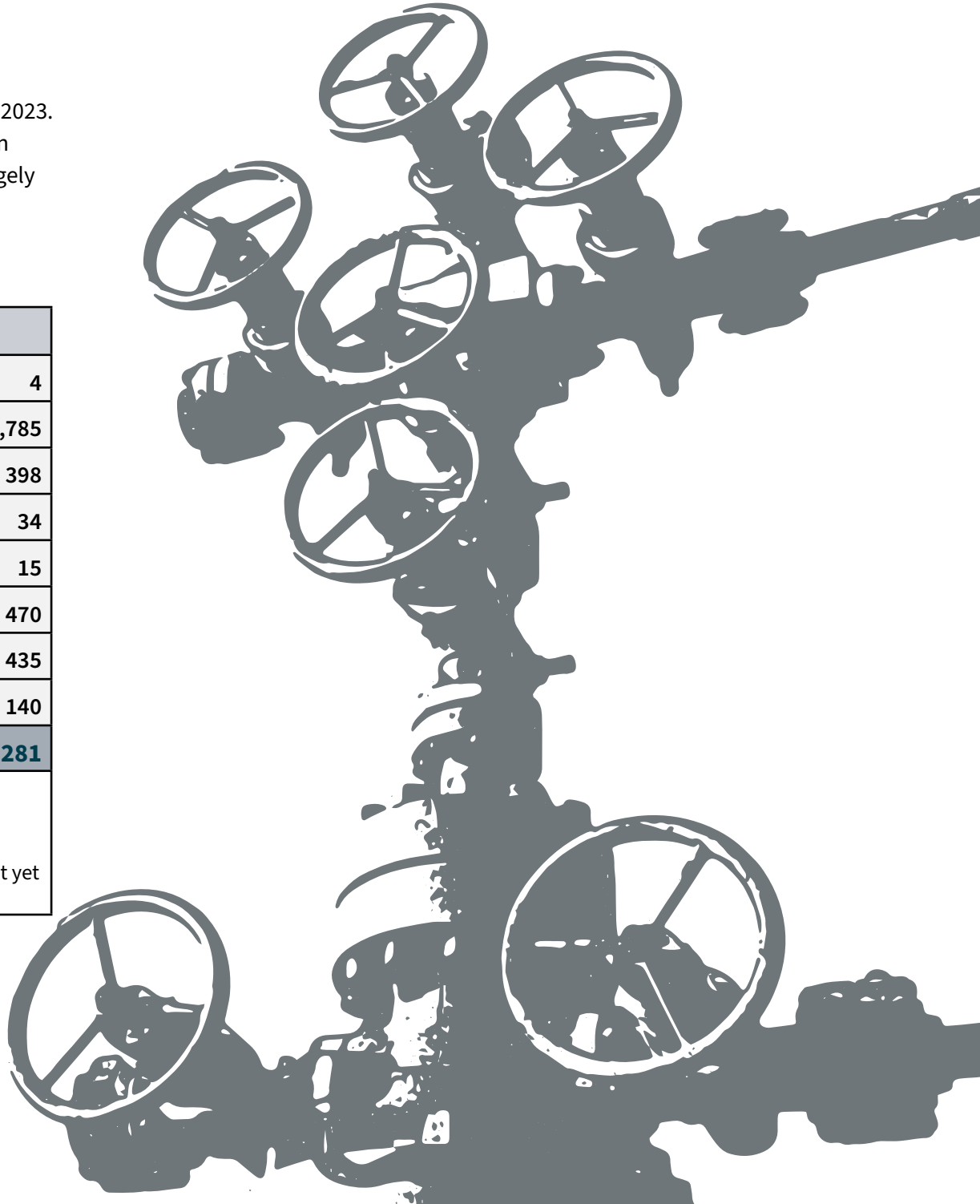


Table 5 details the number of deficiencies issued at facilities that may be related to methane emissions. All of the 308 deficiencies have been corrected.

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

Facility Type	Number of Potential Methane-Related Deficiencies in 2023	
	Deficiencies	Deficiencies Corrected
Battery Site	10	10
Compressor Dehydrator	70	70
Compressor Station	18	18
Disposal Station	2	2
Gas Dehydrator	0	-
Gas Processing Plant	9	9
Gas Sales Meter	0	-
Injection Station	2	2
Natural Gas Liquids Fractionation Facility	0	-
Oil Sales Meter	0	-
Pipeline Gathering	0	-
Processing Battery	4	4
Satellite Battery	3	3
Tank Terminal	0	-
Test Facility	0	-
Water Hub	0	-
Well Facility	190	190
Total	**308**	**308**

Notes:
- "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. All of the 513 deficiencies have been corrected.

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

Well Type	Number of Potential Methane-Related Deficiencies in 2023	
	Deficiencies	Deficiencies Corrected
Acid Gas	0	-
Gas	408	408
Multiple Gas	48	48
Multiple Oil and Gas	0	-
Multiple Oil	1	1
Oil	29	29
Undefined	19	19
Water	8	8
Total	**513**	**513**

Notes:
- "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 2023. Overall, 1,435 surveys were reported with 1,434 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

Facility Type	Number of LDAR Surveys		
	Total Surveys	Comprehensive Surveys (OGI-based)	Screening Surveys (No OGI)
Battery Site	189	189	0
Compressor Dehydrator	340	339	1
Compressor Station	181	181	0
Disposal Station	36	36	0
Gas Dehydrator	8	8	0
Gas Processing Plant	205	205	0
Gas Sales Meter	76	76	0
Injection Station	4	4	0
Natural Gas Liquids Fractionation Facility	3	3	0
Oil Sales Meter	28	28	0
Processing Battery	95	95	0
Pump Station	9	9	0
Satellite Battery	225	225	0
Tank Terminal	12	12	0
Test Facility	1	1	0
Water Hub	23	23	0
Well Facility	Not Applicable	Not Applicable	Not Applicable
Total	**1,435**	**1,434**	**1**

Table 8 details the LDAR surveys reported by industry at wells in 2023 based on well fluid type. Overall, 9,863 surveys were reported with 7,134 (72 per cent) of them involving the use of OGI technology.

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	0	0	0
Gas	8,201	6,327	1,874
Multiple Gas	641	273	368
Multiple Oil and Gas	3	0	3
Multiple Oil	150	132	18
Oil	604	244	360
Undefined	43	30	13
Water	221	128	93
Total	**9,863**	**7,134**	**2,729**

Notes:
- "Multiple" refers to multiple completion events within the same well.
- 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 2023 data submission. In total, 4,840 leaks were identified and 3,830 (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 remained steady at 79 per cent as compared with 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 (e.g., 94 per cent for batteries) and lower at larger, more complex facilities (e.g., 74 per cent for gas processing plants) that are more likely to require facility shutdowns to complete repairs.

Table 9. Summary of Leak Detection and Repairs at Facilities in 2023

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	207	195	12
Compressor Dehydrator	1,092	938	154
Compressor Station	504	368	136
Disposal Station	95	95	0
Gas Dehydrator	0	-	-
Gas Processing Plant	2,366	1,758	608
Gas Sales Meter	48	21	27
Injection Station	0	-	-
Natural Gas Liquids Fractionation Facility	27	19	8
Oil Sales Meter	1	0	1
Processing Battery	195	181	14
Pump Station	2	1	1
Satellite Battery	103	101	2
Tank Terminal	0	-	-
Test Facility	14	13	1
Water Hub	10	3	7
Well Facility	176	137	39
Total	**4,840**	**3,830**	**1,010**

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 2023 data submission. In total, 1,952 leaks were identified, and 1,658 (85 per cent) of the detected leaks were reported as repaired at the time of data reporting. Repair rates at the time of reporting decreased from 92 per cent in 2022 to 85 per cent in 2023. The decrease in repair rates can be mainly attributed to one permit holder whose LDAR submission was incomplete and lacked repair information on some detected leaks. When this one permit holder's data is excluded, the repair rate of detected leaks at wells is 94 per cent.

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.

Table 10. Summary of Leak Detection and Repairs at Wells in 2023

Well Type	Number of Leaks Identified	Number of Leak Repairs Completed	Number of Leak Repairs Not Completed
Acid Gas	0	0	0
Gas	1,772	1,490	282
Multiple Gas	109	103	6
Multiple Oil and Gas	0	0	0
Multiple Oil	8	8	0
Oil	45	39	6
Undefined	15	15	0
Water	3	3	0
Total	**1,952**	**1,658**	**294**

Notes:
- "Multiple" refers to multiple completion events within the same well.
- 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 wells, permit holders with median repair times of less than 30 days accounted for 1,592 of the reported leaks and had repaired 1,484 of these leaks (96 per cent repair rate). Overall, 69 per cent of leaks identified at wells were repaired within 30 days.

For facilities, permit holders with median repair times of less than 30 days accounted for 3,057 of the reported leaks and had repaired 2,663 of these leaks (87 per cent repair rate). Overall, 50 per cent of the leaks identified at facilities were repaired within 30 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 93 per cent of methane emissions from leaks: gas processing plant, compressor dehydrator, compressor station, battery and processing battery.

Leaks associated with storage tanks were the dominant leak source, accounting for 45 per cent of the total volume of leaks that were detected at facilities in 2023. Gas processing plants and compressor dehydrator facilities are most likely to have controlled storage tanks.

Table 11. Summary of Leak Detection Frequency and Volumes at Facilities in 2023

Facility Type	Proportion of Surveys With Leaks Detected (%)	Average Volume of Leaks Detected per Survey (m^3/h)	Proportion of Total Facility Leak Volume (%)*
Battery Site	32	0.2	2
Compressor Dehydrator	75	0.4	25
Compressor Station	65	0.2	5
Disposal Station	42	0.3	1
Gas Dehydrator	0	-	0
Gas Processing Plant	82	0.4	56
Gas Sales Meter	13	0.3	<1
Injection Station	0	-	0
Natural Gas Liquids Fractionation Facility	100	0.2	<1
Oil Sales Meter	4	0.1	<1
Processing Battery	56	0.5	5
Pump Station	11	0.1	<1
Satellite Battery	21	0.3	2
Tank Terminal	50	0.4	<1
Test Facility	0	-	0
Water Hub	22	0.3	<1
Well Facility	15	0.2	2

*Total may not add to 100 per cent due to rounding.

5.3.4. Compliance Review Results

The compliance review addressed three 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 interval for natural gas processing plants. These facilities require three LDAR surveys per year and the minimum time interval between surveys is 60 days.
3. Assessing compliance with leak repair timelines.

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 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 95 per cent of facilities and 94 per cent of wells that required at least one LDAR survey were surveyed in 2023. The BCER has initiated five investigations of permit holders with non-compliances in completing LDAR surveys.

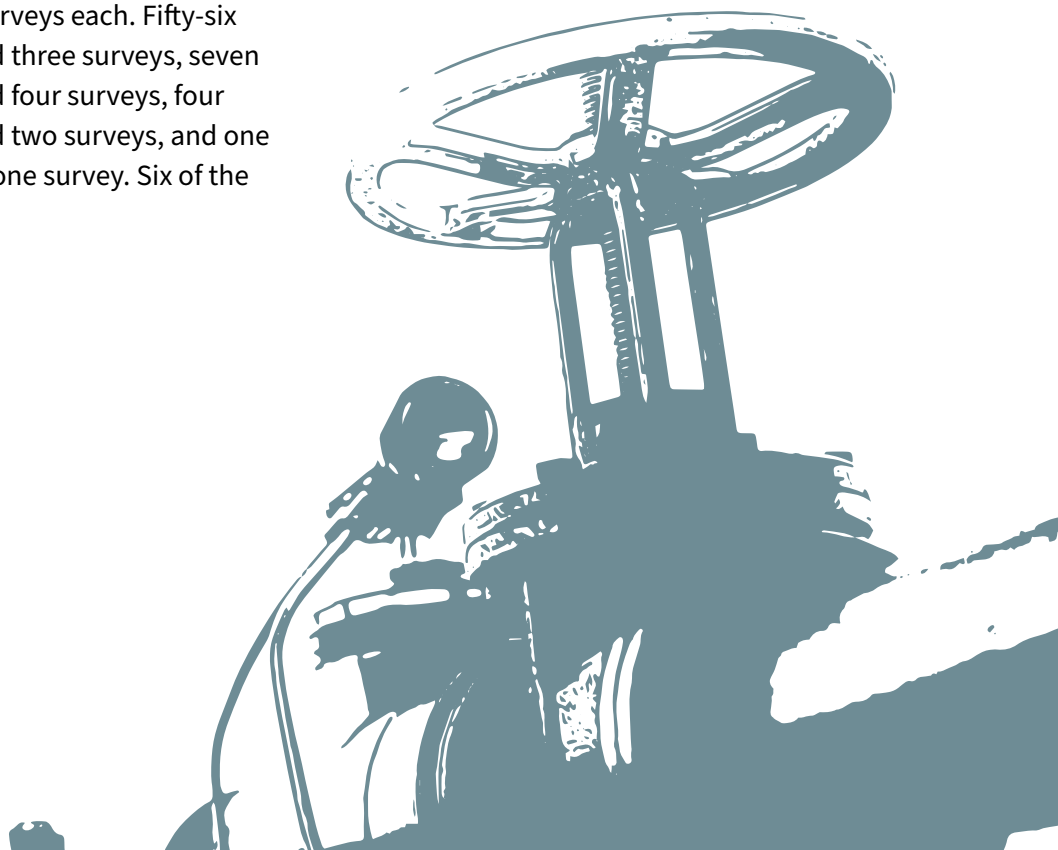
Common reasons for not completing required surveys were as follows:

- 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 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 and minimum survey interval 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 68 gas plants required three surveys each. Fifty-six facilities reported three surveys, seven facilities reported four surveys, four facilities reported two surveys, and one facility reported one survey. Six of the 204 surveys were missed for an overall compliance rate of 97 per cent.
- For the 56 gas plants reporting three surveys, only two surveys occurred within 60 days of a previous survey. There were nine other instances of surveys occurring within 60 days of a previous survey; however, these took place at the seven gas plants where four surveys were reported and are therefore, not indicative of a non-compliance.



For focus area 3, 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 2022 and 2023. From 2022 to 2023, the percentage of leaks reported as repaired at the time of LDAR data reporting was maintained for facilities and decreased for wells (as described in Section 5.3.2). For leaks reported as repaired, the median timeline to repair a leak increased slightly for wells and decreased for facilities from 2022 to 2023.

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)	
	2022	2023	2022	2023
Wells	91	85	6	7
Facilities	79	79	22	19

5.4. Surface Casing Vent Flows

There were three wells with surface casing vent flows that exceed the emissions threshold of 100 m3/d reported in 2023:

- One well has been repaired.
- Two wells have been downhole abandoned, eliminating the venting, and are in the process of 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 2023, the BCER approved 86 new facility permits and 103 facility permit amendments.

5.6. Venting Compliance Audit

In 2023, the BCER completed a venting compliance audit focused on compliance with emissions requirements for pneumatic devices, reciprocating compressor seals and uncontrolled storage tanks. The audit included 20 permit holders including five permit holders of transmission and midstream processing operations and 15 producers.

As the 2022 audit focused on larger producers, the 2023 audit focused on the remaining smaller producers that had not been previously audited. The 15 producers included in the audit accounted for 3.8 per cent of B.C.'s total production.

No non-compliances were identified with the five permit holders of transmission and midstream processing operations.

Non-compliances were identified with eight of the 15 producers including:

- Three reciprocating compressors that exceeded the individual emission threshold for compressor seals.
- Thirty-two pneumatic devices that exceed the emission threshold.

There were no non-compliances identified with the emissions thresholds for uncontrolled storage tanks or the fleet average reciprocating compressor seals. Non-compliances with four of the permit holders have been addressed and there are ongoing enforcement actions to address non-compliance with the remaining four permit holders.

Data from the 2022 and 2023 audits will be used to target future compliance oversight activities to the highest risk permit holders and sites.

6. Continuous Improvement

6.1. 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 is focusing more on compliance activities and escalating enforcement where there is continued non-compliance.

6.2. 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 began Sept. 1, 2022 and was extended in August 2024 to end on Dec. 31, 2026, 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 deep-well 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. The royalty program is managed by the Province.

6.3. Regulation Amendments

In 2024, the BCER amended the provincial methane regulations which will be phased in beginning on Jan 1., 2025. These changes were made in order to achieve the Province's commitment to reduce emissions from the oil and gas sector by 75 per cent by 2030 compared to a 2014 baseline, and a near elimination of all industrial methane emissions (including oil and gas) by 2035. The focus is on key areas and sources of emissions, such as compressor seals, pneumatic pumps and devices, dehydrators, surface casing vent flows, and leak detection and repair requirements. The regulation updates will require automated monitoring systems on equipment with the highest rate of leakage, increase the number of LDAR surveys required for large facilities, tighten venting limits for certain operations, and impose stricter design and operating standards for new and modified facilities. Provincial modelling indicates the 2030 B.C. methane reduction targets will be met with these regulatory amendments.

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 29 separate leaks) to leak repair timelines were received for leaks starting in 2023. Two of the exemptions (totaling 14 separate leaks) were granted. The other exemption request (totaling 15 separate leaks) was not granted as either the DPR was not applicable (LNG Facility) or because the facility needed to be shut down for the repair to occur.

8. Summary

The 2023 Equivalency Report addresses annual reporting obligations outlined in the Equivalency Agreement between Canada and British Columbia, which came into force on March 25, 2020.

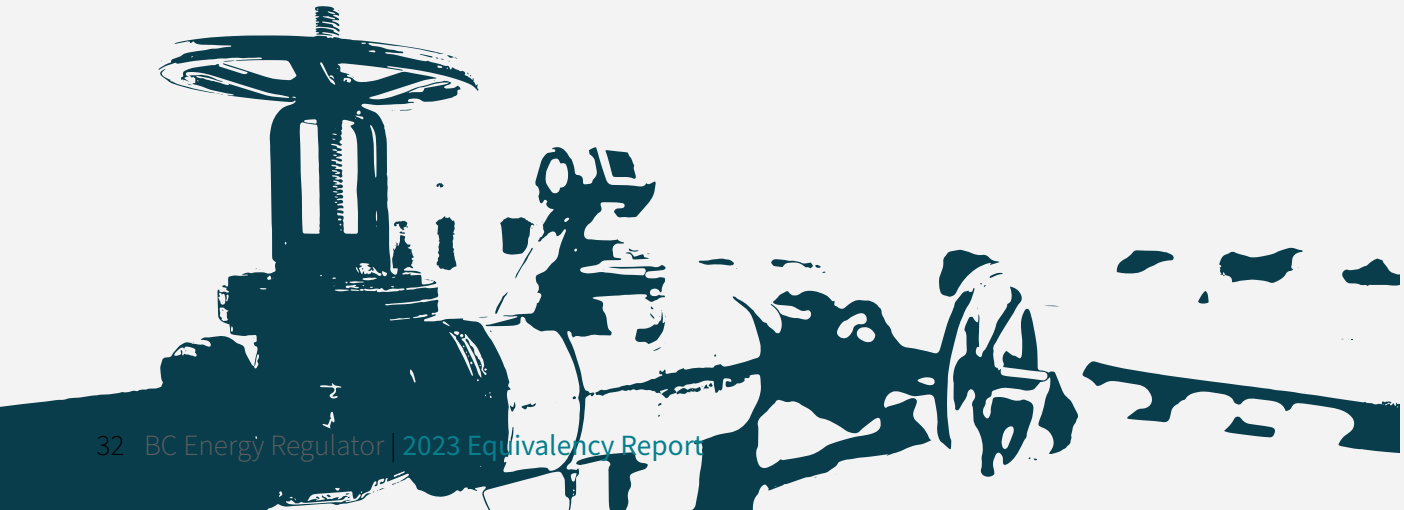
Key findings and information from the 2023 report include:

- The Provincial modeling framework and Provincial GHG Emissions Inventory indicate B.C. is on track to achieve its 2025 methane emissions reduction target.
- Although the 2024 NIR shows fewer methane emission reductions than expected, ECCC and B.C. both acknowledge this underestimation is due to methodological challenges that will be addressed in the 2024 Provincial Inventory and the 2025 NIR.
- 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 focused on emissions requirements for pneumatic devices, reciprocating compressor seals and uncontrolled storage tanks. The audit included 20 permit holders and focused on smaller producers. The audit identified eight permit holders with non-compliances including exceeding individual compressor seal emission thresholds and 32 pneumatic devices exceeding the emission threshold. The BCER has addressed the non-compliance with four of the permit holders while there are on-going enforcement actions for the four other non-compliant permit holders. Data from the 2022 and 2023 audits will be used to target future compliance oversight activities to the highest risk permit holders and sites.
- The BCER conducted an administrative review regarding industry compliance on LDAR reporting requirements. From 2022 to 2023, the percentage of leaks reported as repaired at the time of LDAR data reporting was maintained for facilities and decreased for wells. The decreased repair percentage was mainly due to incomplete LDAR information submitted by one permit holder. Excluding that data indicates an increase in leak repair percentage.
- For leaks reported as repaired, the median timeline to repair a leak decreased for facilities, and slightly increased for wells from 2022 to 2023. The BCER is following up with select permit holders to address leak repair

rates and timelines.

- 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.
- 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.
- In 2024, the BCER amended the provincial methane regulations in order to achieve the Province's methane emission reduction target for the oil and gas sector of 75 per cent by 2030 compared to a 2014 baseline, and a near elimination of all industrial methane emissions (including oil and gas) by 2035. The amendments will be phased in beginning on Jan. 1, 2025.
- 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 and co-funding a study to advance world leading measurement research through Carleton University's Energy and Emissions Research Lab.

  » Measurements completed in 2021 indicate B.C.'s oil and gas sector has a methane emission intensity between 0.38%-0.48% (percent emissions of production), well below the national measurement informed methane intensity (1.1%-1.8%).



February 2025

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