ALT-FEMP FINAL PERFORMANCE REPORT

2023-2024 Intricate Multi Operator

Prepared For:

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Executive Summary

Intricate Group Inc. (Intricate) is a Canadian energy and emissions management firm providing regulatory consulting, compliance reporting, field measurement, and digital solutions to the oil and gas industry. On behalf of multiple operating partners, Intricate administers a multi-operator Alternative Fugitive Emissions Management Program (Alt-FEMP) encompassing program design, budget governance, technical coordination, and regulatory performance reporting under the Alberta Energy Regulator's (AER) Directive 060, Section 8.

The Alt-FEMP employs advanced methane screening and quantification technologies to enhance detection efficiency and emission mitigation outcomes beyond those achievable under a conventional Fugitive Emissions Management Program (FEMP). Initial phases of the program utilized aerial gas-mapping LiDAR (a-LiDAR) to perform broad-scale methane screening across participating sites, identifying potential emission sources and prioritizing high-impact follow-up surveys. Emission quantification data provided by the a-LiDAR analytics team were reviewed by Intricate to identify facilities with estimated emissions exceeding 350 m^3/day, as well as the top 35% of emitting sites by magnitude. These sites were subsequently scheduled for targeted Optical Gas Imaging (OGI) investigations to localize emission sources and facilitate timely repairs.

In 2023, the pilot Alt-FEMP encompassed 854 sites operated by multiple licensees across Alberta. An additional 89 sites were retained under baseline FEMP conditions to serve as a control group for performance benchmarking and equivalency validation. Due to environmental and logistical constraints, including restricted airspace, winter weather, and regional wildfire activity, the 2024 screening campaigns transitioned from aerial LiDAR to ground-based mobile methane detection using Boreal Laser's truck-mounted Tunable Diode Laser Absorption Spectroscopy (TDLAS) system. This modification maintained regulatory equivalency while enabling higher measurement fidelity and improved site-level diagnostic accuracy.

Although the ground-based screening approach required longer deployment timelines, it yielded enhanced data granularity and more precise methane concentration mapping, resulting in an increased number of follow-up OGI surveys. The 2024 campaigns confirmed the robustness of the hybrid technology framework, demonstrating that integrating multiple screening modalities can optimize both detection sensitivity and operational practicality across diverse site conditions.

Establishing a shared-services model among participating operators enhanced logistical efficiency, standardized data workflows, and significantly reduced per-site implementation costs. Cumulatively, the program achieved measurable reductions in methane emissions, validating the technical feasibility and regulatory equivalency of alternative detection methodologies within Alberta's compliance framework. The findings reaffirm that operator responsiveness to identified leaks, through timely follow-up and repair, remains the principal determinant of methane mitigation success under any FEMP or Alt-FEMP construct.

1. Screening Data

The screening campaigns conducted under the Alt-FEMP utilized three distinct detection technologies and methodologies across the 2023 and 2024 program years. 2023 Screening 1 was completed using Bridger Photonics' aerial Gas Mapping LiDAR (a-LiDAR), which performed flyovers to identify methane plumes across participating sites. Any site exhibiting a measurable emission was flagged for a targeted Optical Gas Imaging (OGI) follow-up. 2023 Screening 2 incorporated a combined ground-based OGI and Quantitative Optical Gas Imaging (QOGI) survey using FLIR GFx320 and QOGI instrumentation, enabling both qualitative and quantitative verification of emission sources.

In 2024, both screening campaigns transitioned to truck-mounted laser detection utilizing Boreal Laser's Tunable Diode Laser Absorption Spectroscopy (TDLAS) technology. Sites where methane concentrations exceeded 3 parts per million (ppm) were flagged for OGI follow-up inspections. This technology shift was driven by operational constraints associated with aerial surveys and the desire for improved ground-level precision and faster deployment flexibility.

Given the variation in technology type, detection sensitivity, and environmental operating conditions, direct comparison of year-over-year screening results should be interpreted with caution. As shown in Table 1, the number of sites screened increased from 1,081 in 2023 to 1,606 in 2024, while the percentage of sites with detections rose from 39% to 49%, reflecting enhanced ground-level sensitivity and more refined detection thresholds. The proportion of follow-up sites also increased from 29% to 51%, illustrating improved survey coverage and follow-up integration under the mobile laser-based approach.

Overall, the 2024 campaigns demonstrated a higher detection frequency and more consistent follow-up execution, suggesting improved program efficiency and technological reliability. Additional site- and event-specific screening data are presented in Table 4 for detailed reference.

Table 1 Screening Data Details

Parameter	2023	2024
Number of sites screened	1,081	1,606
Number of unique sites screened	854	825
Method Detection Limit	1 g CH4/hr	0.6ppm
Number of sites with detections	417	785
Number of detections	1,006	786
Percentage sites with detections (%)	39%	49%
Average rate of emissions per site with detection (m3/d)	196.58	24.84(ppm)
Total rate of emission identified (m3/d)	197,790.04	19.520(ppm)
Number of sites followed up	237*	821
Number of unique sites followed up	237*	572
Percentage of sites followed up (%)	29%*	51%
Number of follow-up sites with no detections**	72	470
Number of follow-up emissions with emission source not detected	72	470
Average time between detection to follow-up to site (d)	35	38
Percentage of follow up sites that are reoccurring (%)	N/A*	42%
Number of emissions from the screenings that were followed up	477	953
Number of emissions from the screenings that were followed up and identified as fugitive emissions	444	953
Rate of fugitives identified and fixed for the year (m3)	608,461	701,834

*2023 follow up sites only related to follow ups completed against the first screening of 826 sites, since the second screening included all sites and there was essentially 0%/100% follow up.

**number of sites with no follow up detections is specifically sites with no fugitive detections as vents were not included as part of the Intricate work practice.

2. Follow Up Data

Table 2 summarizes the results of the Optical Gas Imaging (OGI) follow-up surveys conducted across all screening campaigns under the Alt-FEMP. All follow-up inspections were performed using FLIR GFx320 cameras, with quantitative measurements obtained through FLIR Quantitative Optical Gas Imaging (QOGI) technology to determine methane emission rates at the source level. OGI enables the localization of emissions to specific equipment components and allows the operator to distinguish between fugitive and vented emission types with high precision.

The 2023 follow-up campaigns encompassed 237 sites, while 2024 expanded coverage to 821 sites, corresponding to approximately 51% of all screened locations. The increase in follow-up activity reflects the improved integration between screening detection outputs and field mobilization efficiency. The percentage of follow-up sites with no detected emissions rose from 30% in 2023 to 57% in 2024, a result likely attributable to the higher screening sensitivity of the Boreal system, which flagged more low-level or transient emission events that were not subsequently confirmed on site.

Table 2 Survey Data Details

Parameter		2023	2024
Number of sites followed-up on for the year		237	821
Number of unique sites followed-up on for the year		237	572
Percentage of screened sites followed-up on (%)		98%*	51%
Percentage of sites with screening detections followed-up on (%)		56%	104%
Number of follow-up surveys where no emissions were found		30%	57%
Average time between detection and follow-up to site (days)		35	38
Percentage of follow-up sites that are reoccurring (%)		N/A*	42%
Identified emission source types per follow-up per screening campaign (vent, fugitive, methane slip, other)		Fugitive and Vent	Fugitive and Vent
Number of detections by emission source type (n)	**Fugitives**	444	953
	Vents	32	0
	Total	476	953
Volume of detections by emission source type (m^3/day) (average)	**Fugitives**	158.56	119.32
	Vents	520.40	N/A
	Total	182.83	119.32
Number of reoccurring leaks observed		18	277
Total emission rate of fugitives identified and fixed for the calendar year (m^3/day) (total volume / total days leaking)		118.92	96.16

*2023 follow up sites only related to follow ups completed against the first screening of 826 sites, since the second screening included all sites and there was essentially 0%/100% follow up.

As shown in Table 3, the predominant fugitive emission sources in both years were associated with compressors, separators, tanks, and wellheads, consistent with known high-frequency leak points in upstream production infrastructure. The average fugitive emission rate decreased from approximately 159 m^3/day in 2023 to 119 m^3/day in 2024, indicating improved emission control and repair effectiveness among participating operators.

Table 3 Survey Equipment Details

Equipment Type	2023		2024	
	Number of detections	Avg. rate of detections (m^3/d)	Number of detections	Avg. rate of detections (m^3/d)
Dehydrator	30	98.20	30	108.62
Compressor	151	144.45	257	122.36
Diaphragm	1	104.51		
Engine	19	287.71		
Filtration			1	96.77
Fitting	9	152.56		
Fractionation			3	91.01
Fuel Gas System			35	86.60
Header	1	174.18		
Heater/Boiler			12	85.45
Meter	19	179.63	5	76.17
other	16	136.21	38	125.33
Pigging			5	83.36
Pipeline			21	101.18
Pneumatic	2	89.58		
Pressure Gauge	1	76.14		
Pressure Regulator	7	147.95		
Pumpjack	12	231.29		
Refrigeration			49	77.46
Separator	92	192.44	215	114.35
Stabilizer			7	43.50
Surface Casing Vent	7	138.28		
Tank	31	528.84	20	284.58
Threaded Connection	10	95.55		
Treater			13	126.30
Valve	13	164.50		
Wellhead	55	134.17	242	127.57
TOTAL	**476**	**182.83**	**953**	**119.32**

Overall, the follow-up survey data demonstrate effective alignment between screening detections and field verification activities. The integration of QOGI quantification within the follow-up workflow strengthened data defensibility, while the increasing number of verified fugitive repairs provides evidence of sustained methane reduction performance across program years.

3. Emissions Summary

3.1 Screening Summary

Figures 1 and 2 illustrate the distribution of site-total methane emission rates detected during the 2023 and 2024 screening campaigns, encompassing all identified emission types, including fugitive and vented sources. Figures 3 and 4 depict the distribution of individual emission rates for sites where detections were recorded, providing a more granular representation of screening technology performance across survey years.

The 2023 aerial Gas Mapping LiDAR (a-LiDAR) campaign produced emission data in volumetric flow rate (m^3/day), whereas the 2024 truck-mounted laser detection system reported measurements in parts per million (ppm). This distinction reflects a methodological evolution in detection technology, making direct comparison between years qualitative rather than quantitative. Nonetheless, both datasets exhibit a similar right-skewed distribution pattern, characterized by a small number of high-emitting sites contributing disproportionately to total detected emissions—a trend consistent with empirical findings across methane emission studies in upstream oil and gas operations.

Screening technologies, by design, cannot fully differentiate between fugitive and vented methane emissions at the detection stage. As such, the data presented represent total site-level methane activity rather than verified fugitive volumes. Classification of emission type and source localization occurred during subsequent Optical Gas Imaging (OGI) follow-up surveys, ensuring regulatory compliance with Directive 060 verification requirements.

Notably, the 2024 screening results demonstrated a higher overall detection rate (49%) compared to 2023 (39%), driven by the improved sensitivity and spatial resolution of the Boreal Laser TDLAS platform. This increase suggests enhanced capability to identify smaller and more transient methane releases at ground level, reinforcing the complementary value of integrating multiple screening modalities within a large-scale Alt-FEMP framework.

Table 4 Program Summary Fugitive Data

The below table summarizes additional key metrics and performance indicators from the program by event, specifically for fugitive emissions. Any surveys that identifies vents have been excluded.

	2023			2023 Subtotal	2024				2024 Subtotal	TOTAL
	Screening 1	Survey 1	Screening 2/Survey 2		Screening 1	Survey 1	Screening 2	Survey 2		
Method	**Aerial**	**OGI/QOGI**	**OGI/QOGI**		**Truck**	**OGI/QOGI**	**Truck**	**OGI/QOGI**		
Total Sites Inspected	826.00	229.00	252.00	1,307.00	816.00	378.00	790.00	443.00	2,427.00	**3,734.00**
Site with Screening Alarms	276.00	N/A	138.00	414.00	332.00	N/A	453.00	N/A	785.00	**1,199.00**
Sites with Follow Up Leaks	N/A	158.00	138.00	296.00	N/A	200.00	N/A	163.00	363.00	**659.00**
Total Leaks	N/A	445.00	708.00	1,153.00	N/A	531.00	N/A	422.00	953.00	**2,106.00**
Average Emissions Rate (m3/d)	473.43	158.56	90.27	240.75	20.33*	112.58	28.15*	127.79	89.51	**N/A**
Total Annual Emissions (m3)	130,666.00	70,557.00	63,912.00	265,135.00	6,769.00*	59,781.00	12,751.00*	53,926.00	42,152.67	**307,287.67**
Leaks Repaired	N/A	151.00	81.00	232.00	N/A	111.00	N/A	162.00	273.00	**505.00**
Mitigated Annual Volume (m3)	N/A	20,756.00	6,220.00	26,976.00	N/A	8,603.00	N/A	17,648.00	26,251.00	**53,227.00**

% of screened sites with alarm	33.4%				40.7%		57.3%		32.3%	**32.1%**
% of screened sites surveyed		27.7%	100.0%	44.6%		46.3%		56.1%	51.1%	**48.5%**
% of screened alarm sites surveyed		83.0%	100.0%	88.6%		113.9%		97.8%	104.6%	**99.1%**
% of survey sites with leaks		69.0%	54.8%	61.5%		52.9%		36.8%	44.2%	**50.6%**
% of leaks repaired		33.9%	11.4%	20.1%		20.9%		38.4%	28.6%	**24.0%**

*values are in ppm from Boreal Laser not m3/d

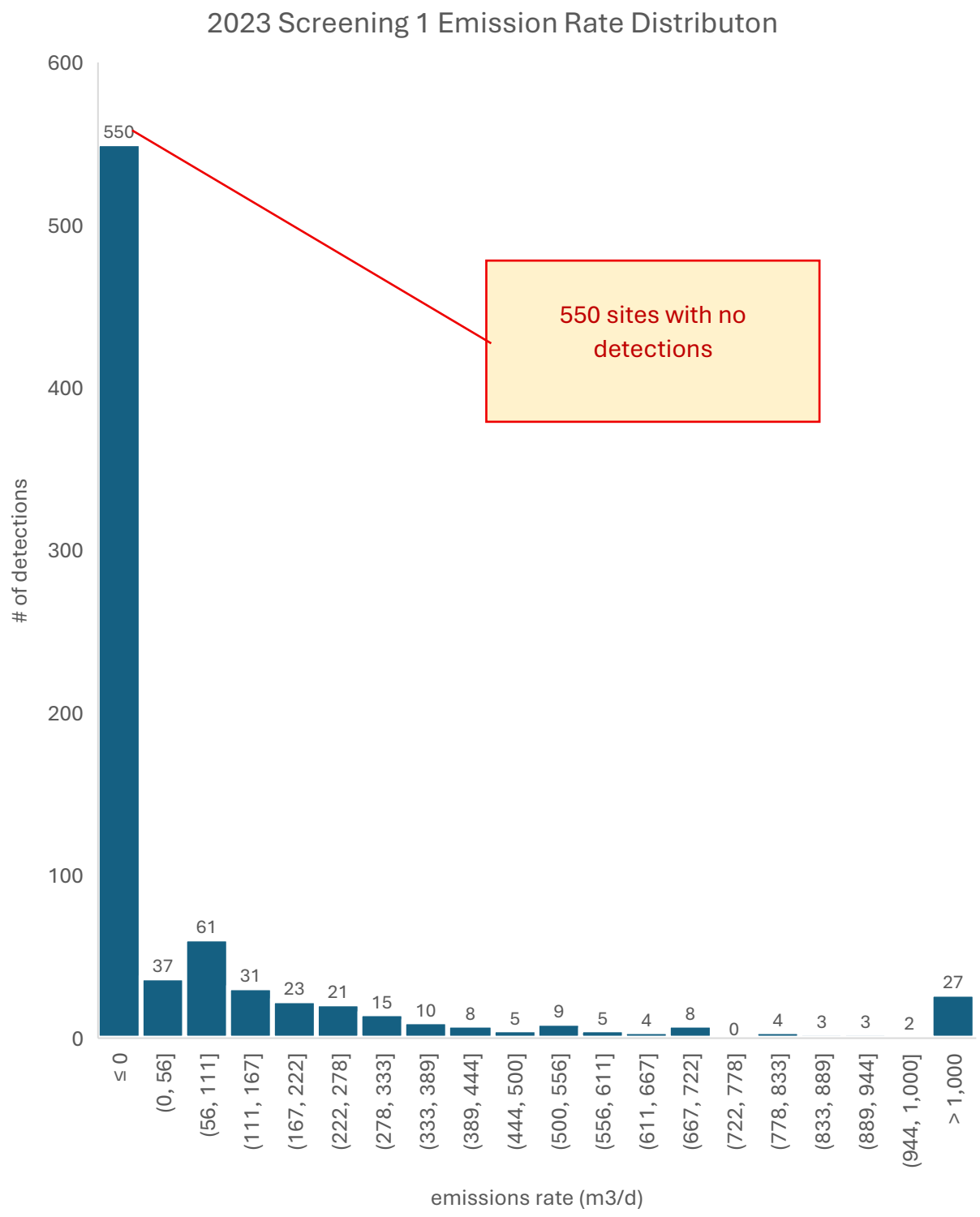

Figure 1 2023 Flyover Screening Histogram

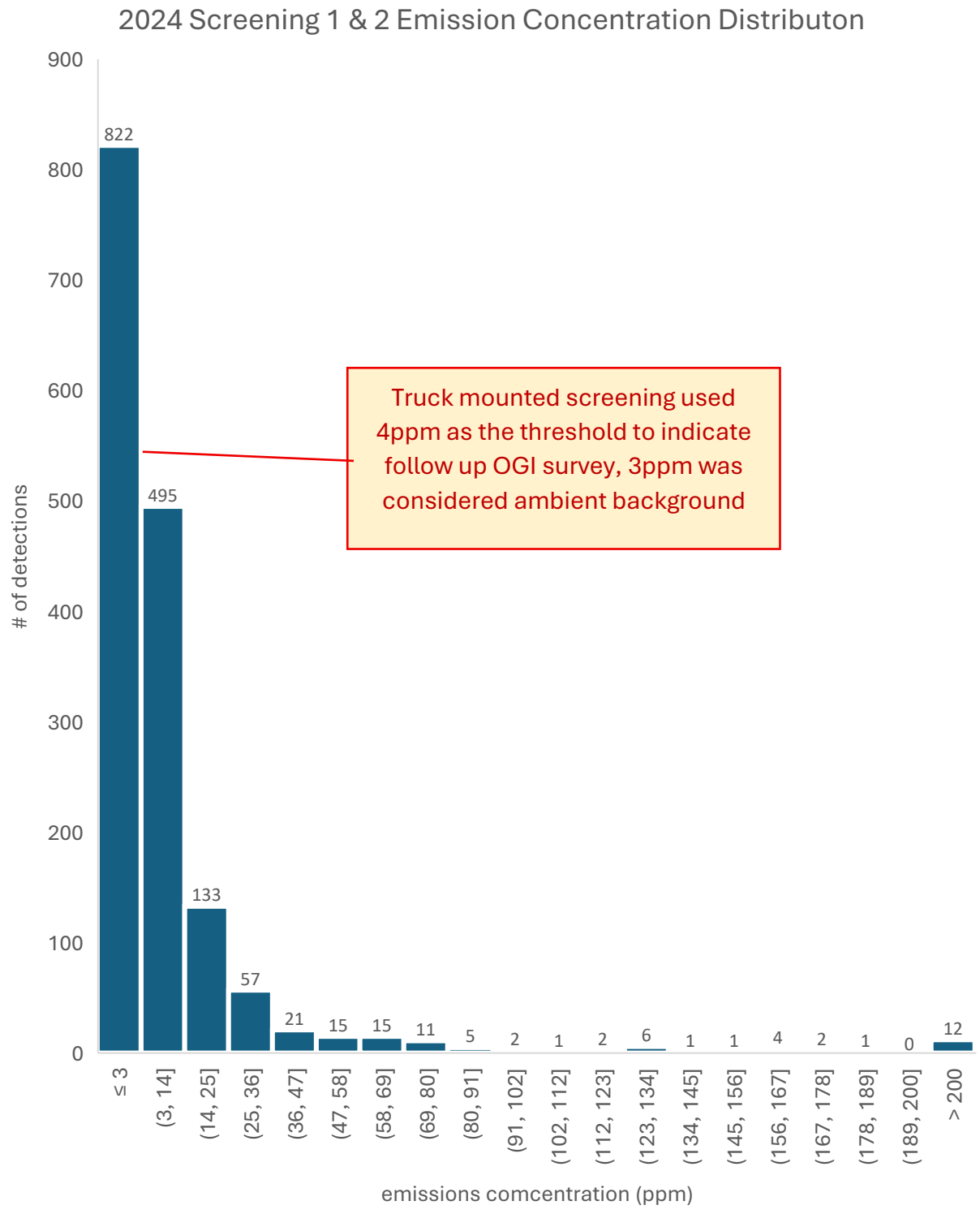

Figure 2 2024 Truck Mounted Screening Histogram

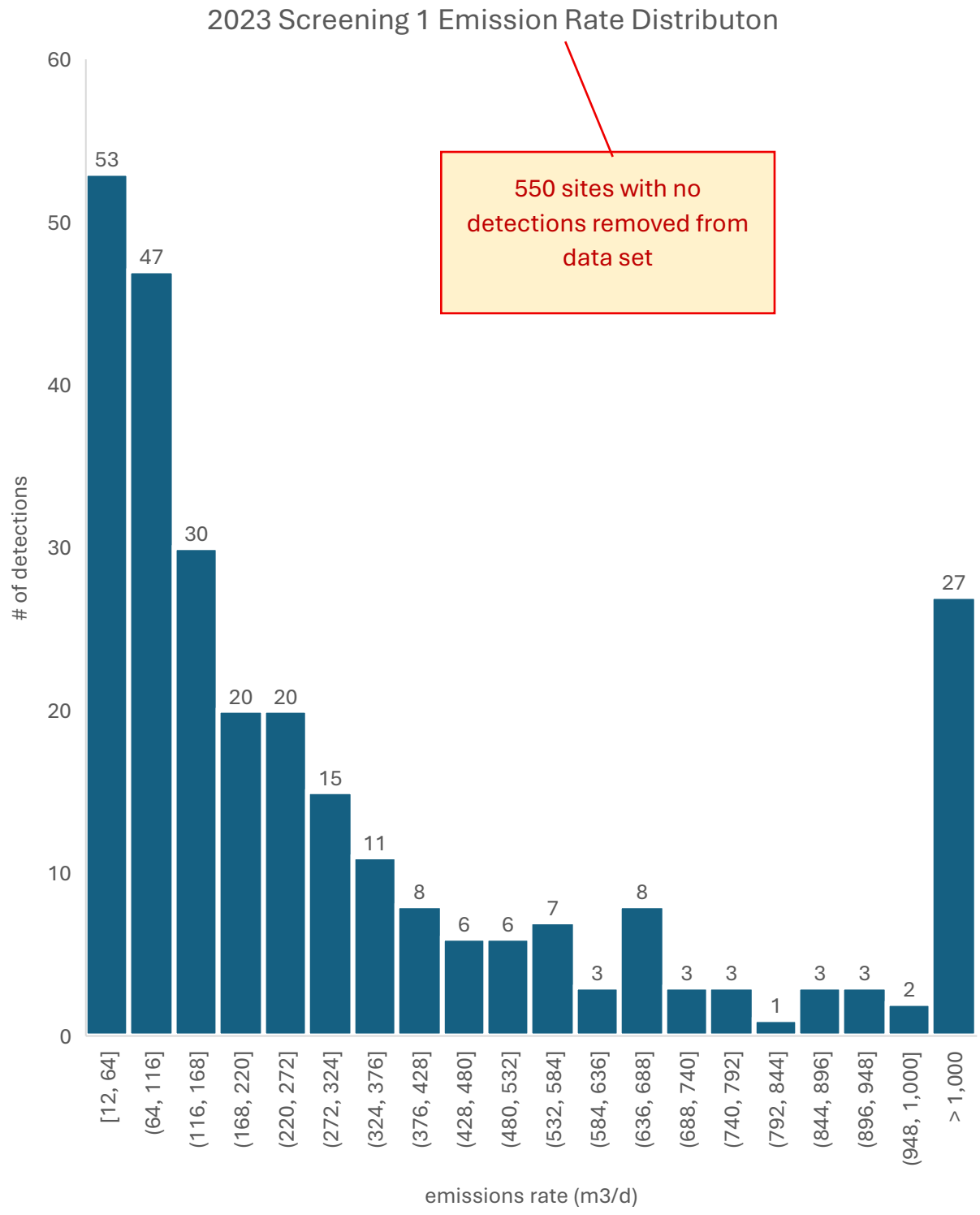

Figure 3 Flyover Screening Histogram - Detections Only

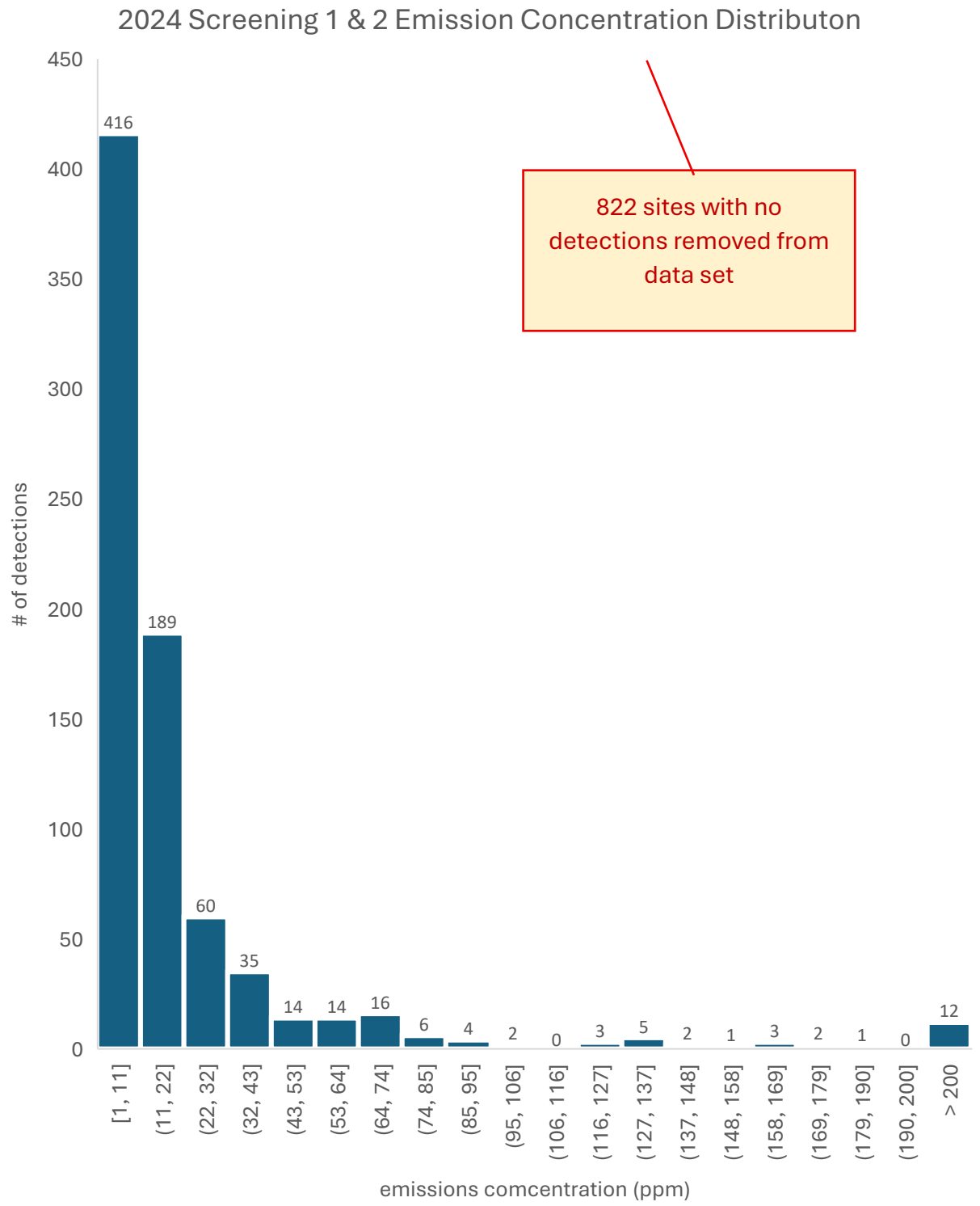

Figure 4 2024 Truck Mounted Screening Histogram - Detections Only

3.2 OGI Survey Summary

Figures 5 through 7 present the results of the Optical Gas Imaging (OGI) survey campaigns conducted under the Alt-FEMP, capturing the distribution of measured methane emission rates at various levels of aggregation. Figure 5 illustrates the site-total emission rate distribution, providing an overview of cumulative methane volumes observed across all surveyed facilities. Figure 6 displays the distribution of individual emission rates measured during follow-up inspections, while Figure 7 isolates the subset of fugitive emissions, representing unintentional releases directly attributed to equipment or component leaks.

Across both program years, the OGI data exhibit a characteristic right-skewed distribution, where a small number of sites or emission points account for a disproportionately large share of total detected methane. This trend aligns with established findings in methane emission studies and reinforces the importance of targeted mitigation at high-emitting sources. The inclusion of quantitative OGI (QOGI) measurements strengthened the ability to correlate observed plumes with specific emission rates, supporting both emissions accounting and repair prioritization.

The 2024 surveys recorded a broader range of low-intensity detections relative to 2023, suggesting improved detection precision and more consistent survey coverage across site types. The predominance of fugitive sources in the dataset underscores the continued value of OGI verification as a critical complement to remote sensing, enabling accurate source localization and confirmation of regulatory equivalency under Directive 060.

Overall, the OGI survey results validate the integration of close-range, high-resolution imaging as an essential component of the Alt-FEMP workflow, ensuring that detected emissions are accurately characterized, quantified, and subsequently mitigated through timely operator action.

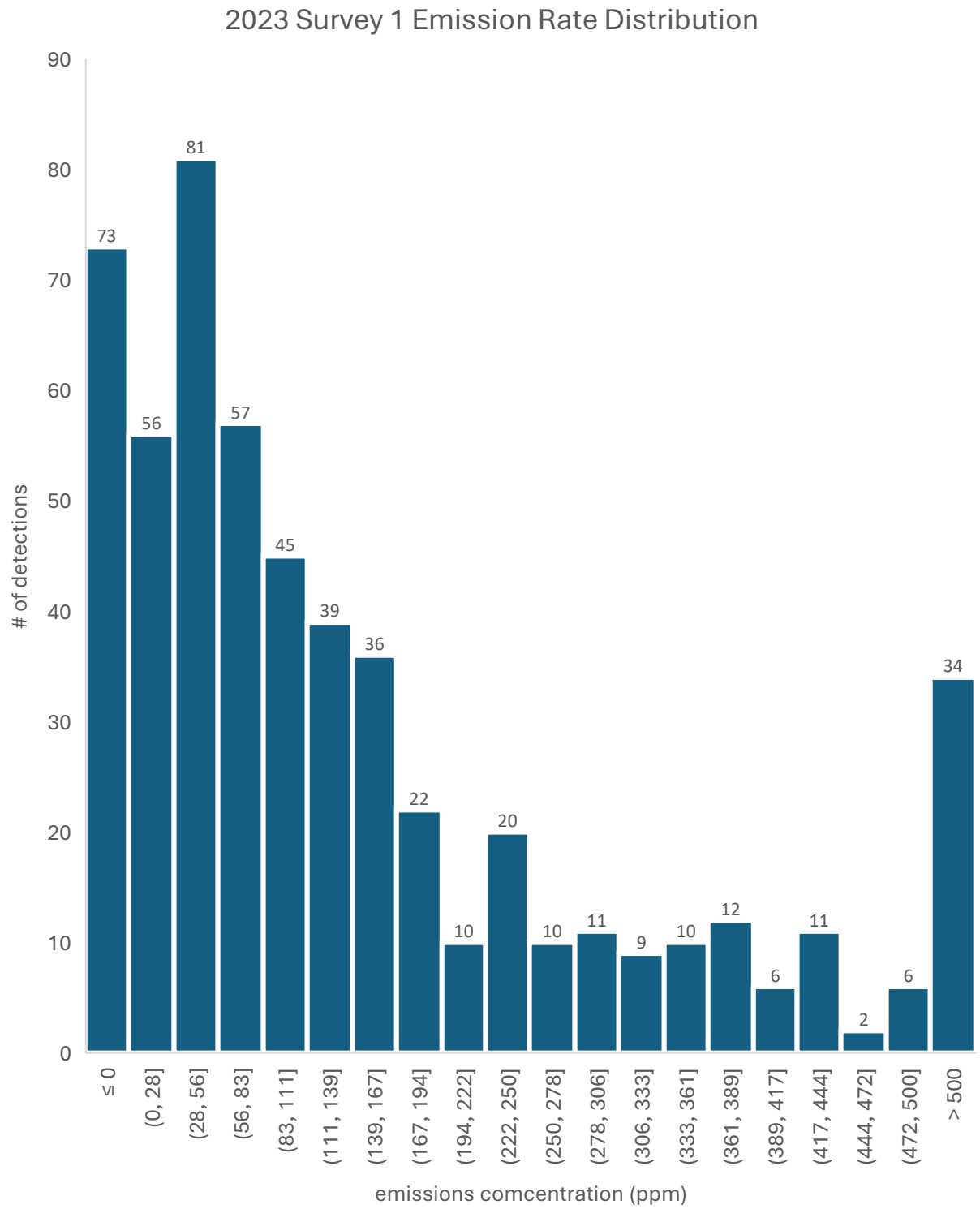

Figure 5 2023 Survey 1 Histogram

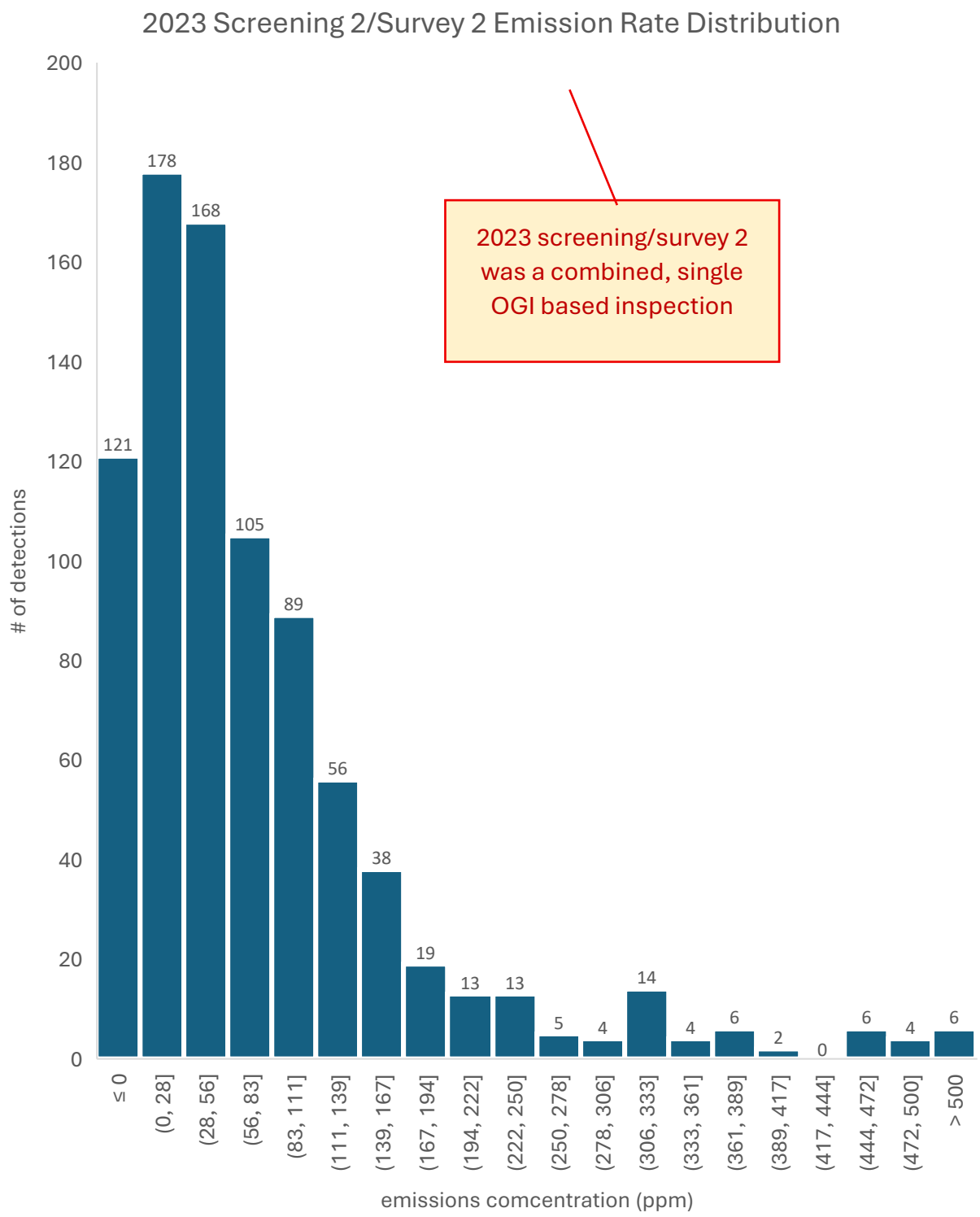

Figure 6 2023 Survey 2 Histogram

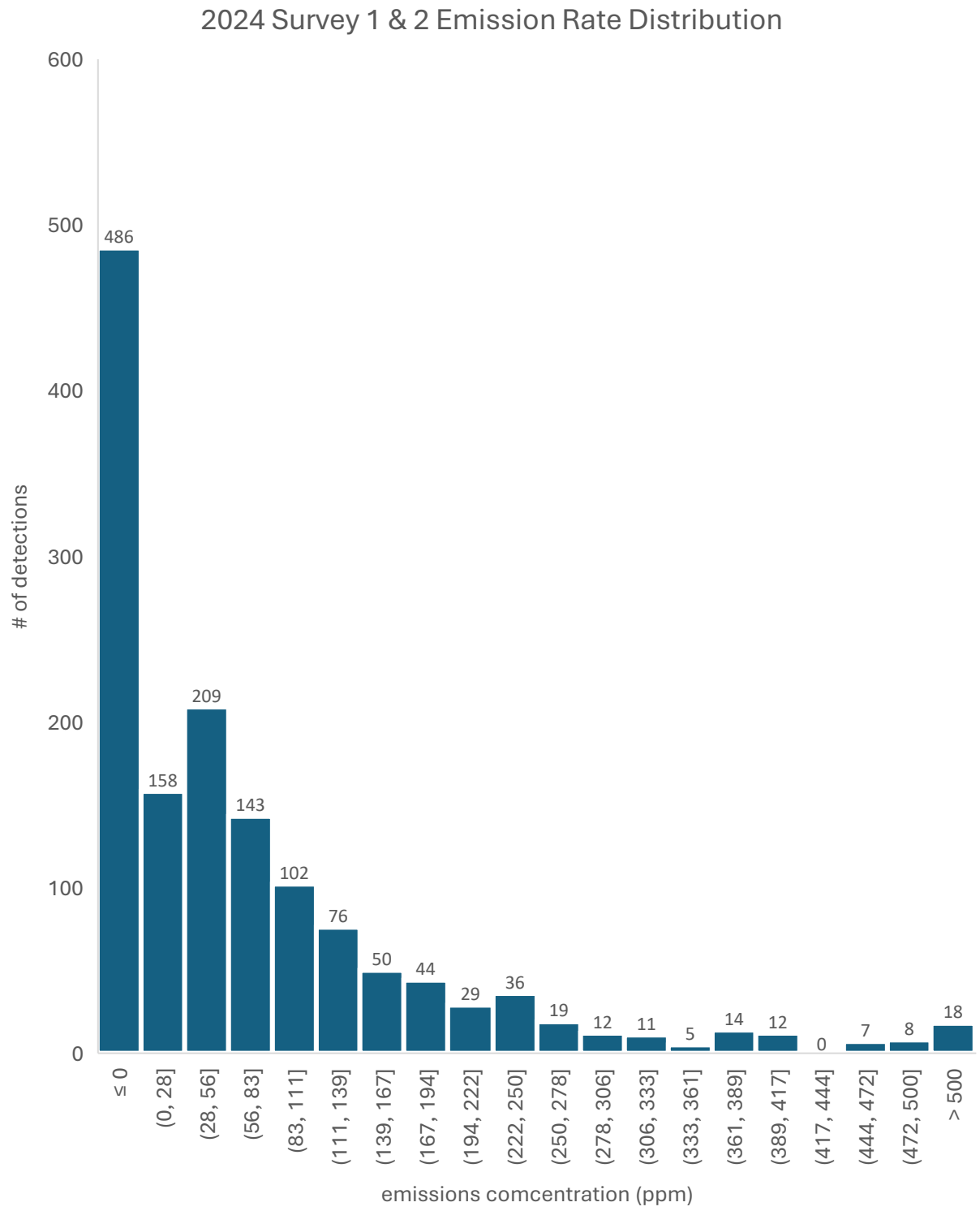

Figure 7 2024 Survey 1 & 2 Histogram

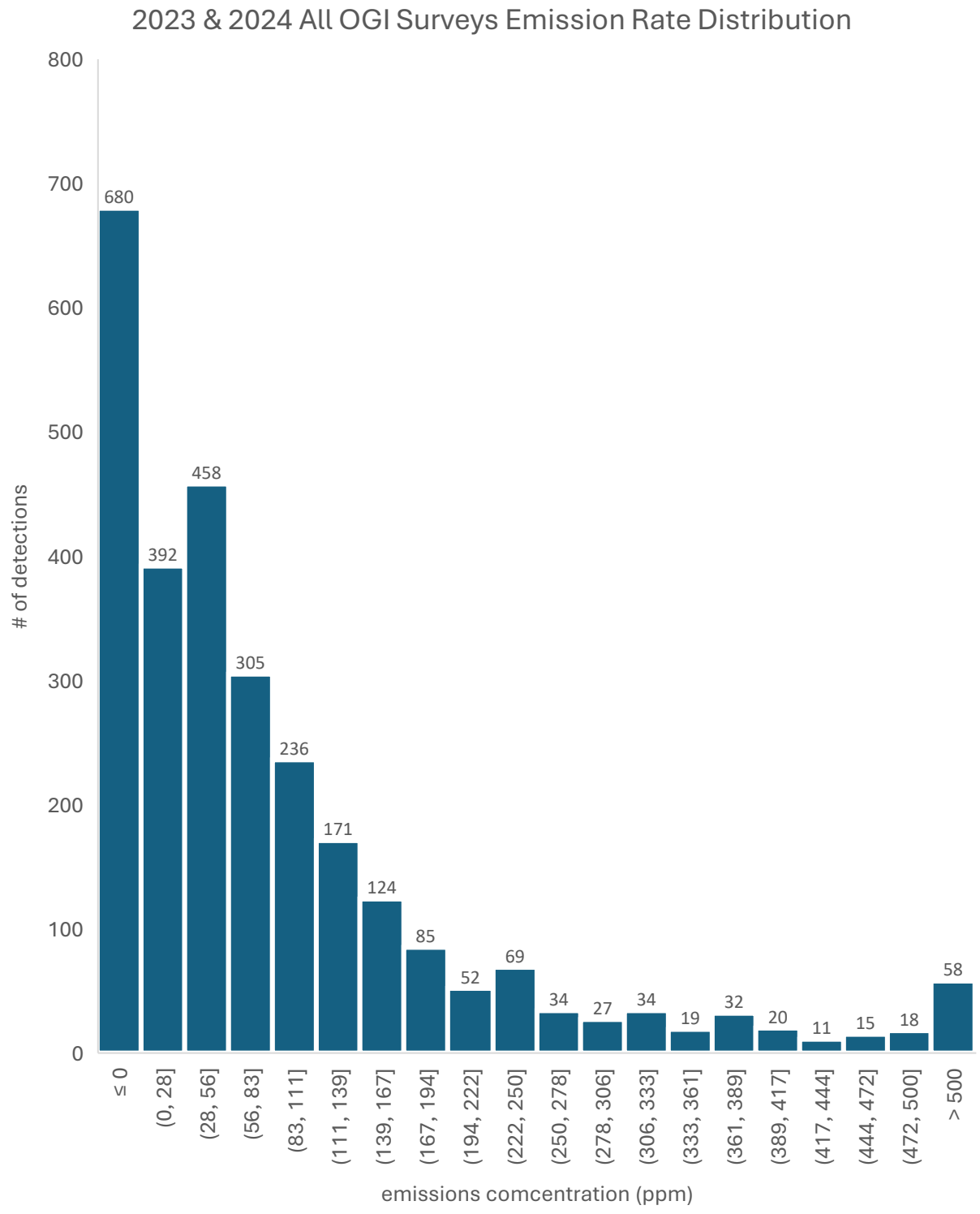

Figure 8 Consolidated Survey Histogram

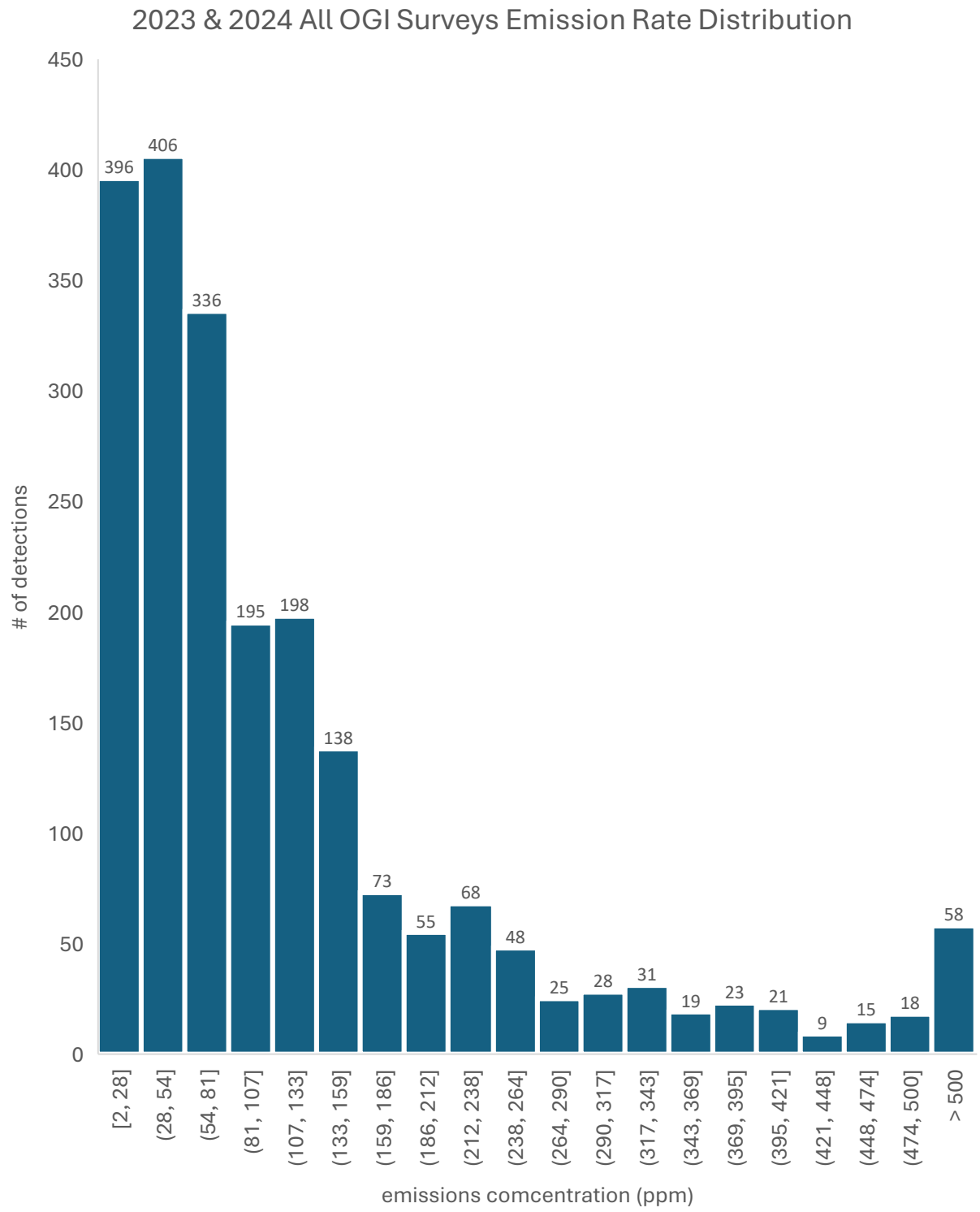

Figure 9 Consolidated Survey Histogram - Detections Only

4. Emissions Reduction Summary

Completion of the final emissions reduction analysis remains contingent upon the availability of volumetric flow data from the 2024 Boreal Laser TDLAS campaigns. Boreal Laser is in the process of finalizing its methane quantification calibration framework, which will enable direct conversion of concentration data (ppm) into volumetric flow rates (m^3/day). Once these data are validated and integrated, a consolidated emissions reduction summary will be produced to quantify total methane mitigation achieved under the Alt-FEMP.

Preliminary analysis based on Optical Gas Imaging (OGI) and Quantitative OGI (QOGI) results indicates that the program achieved substantial reductions in verified fugitive methane emissions across both reporting years. The combined datasets suggest consistent year-over-year improvements in detection-to-repair efficiency, supported by increased follow-up coverage and faster verification timelines. The 2024 campaigns benefited from enhanced ground-based detection sensitivity, enabling earlier intervention and repair of low-rate emission sources that might otherwise have persisted undetected.

While precise volumetric reductions are pending final quantification, the cumulative trends strongly indicate measurable and sustained emission reductions across participating operators. The integration of multiple detection modalities, coupled with coordinated operator response, has resulted in a demonstrable improvement in both leak mitigation effectiveness and overall methane management performance within the Alt-FEMP framework.

Upon receipt of the final quantification dataset, Intricate will complete the comprehensive emissions reduction analysis, providing definitive estimates of total methane volume mitigated and confirming compliance equivalency with the AER's Directive 060 performance benchmarks.

5. Technology Limitation

5.1 Aerial Screening

The Bridger Photonics Gas Mapping LiDAR (a-LiDAR) system demonstrated strong capability for large-scale methane screening but presented several operational and technical limitations that constrained its effectiveness as a standalone leak detection and repair (LDAR) solution. While aerial LiDAR offers rapid spatial coverage and high detection probability for large plumes, its ability to discriminate between fugitive and vented emissions remains limited, leading to potential false positives and unnecessary follow-ups.

The method's sensitivity is influenced by meteorological and topographic conditions, particularly wind speed, turbulence, and terrain complexity. Detection limits typically fall near 1 kg CH_4/hour, making smaller leaks more challenging to identify. Additionally, data processing and turnaround times exceeding 30 days reduced the timeliness of repair actions, which is a critical factor under Directive 060's 24-hour repair requirement for significant leaks. Quantification uncertainty, particularly at both high and low emission magnitudes, further constrained the accuracy of emissions rate estimates for regulatory reporting purposes.

5.2 Truck Mounted Screenings

The Boreal Laser Gas Finder TDLAS system introduced in 2024 provided improved sensitivity, measurement precision, and operational adaptability. As a ground-based technology, the system enabled closer-range detection and reduced atmospheric interference, resulting in enhanced confidence in methane concentration data. However, several practical constraints were observed.

Detection capability is partly dependent on emission height and line-of-sight, meaning elevated or obstructed plumes may fall outside the sensor's optimal detection envelope. Site accessibility can also limit survey reach, particularly in areas affected by adverse terrain or weather conditions. Wind variability remains a contributing factor to concentration dispersion, necessitating careful pre-survey measurement of ambient wind speed and direction to maintain data integrity.

Despite these limitations, the TDLAS system demonstrated high temporal stability and minimal measurement drift due to its internal reference cell and autonomous calibration functions. The platform's zero-drift configuration and automated quality checks allowed for consistent long-term deployment without field recalibration. Comparative testing against known methane sources confirmed the system's detection accuracy and reliability under operational conditions representative of Alberta's upstream sector.

6. Success of the alt-FEMP

The Alternative Fugitive Emissions Management Program (Alt-FEMP) successfully demonstrated regulatory equivalency to a standard Directive 060 FEMP by integrating aerial and ground-based methane detection with Optical Gas Imaging (OGI) verification. The hybrid approach improved detection accuracy, expanded survey coverage, and facilitated timely leak repair across multiple operators. The results validate the Alt-FEMP as a technically sound and scalable alternative to conventional LDAR programs within Alberta's regulatory framework.

7. Non-Performing Element

The primary performance limitations identified during the Alt-FEMP were associated with data latency from aerial screenings and inconsistent operator reporting of leak repairs. Delays of up to 30 days in receiving LiDAR data occasionally prevented timely response to high-priority leaks, limiting repair efficiency within the 24-hour regulatory requirement. Additionally, variations in the timeliness and completeness of operator-supplied repair records introduced data continuity challenges. These issues underscore the need for accelerated data turnaround and standardized reporting protocols to ensure full regulatory compliance and maximize methane mitigation effectiveness.

8. Additional Control Measures

Any sites that had no detections during screenings were revisited at a ate of 10% which was selected based on the sites that had the highest potential dispersion and/or interference due to inclement weather during screening.

9. Additional Information

9.1 Methodology

9.1.1 Aerial Screening (2023)

Aerial methane screening was conducted using Bridger Photonics' Gas Mapping LiDAR (a-LiDAR) technology. The system collected plume imagery, estimated vent rates (kg CH_4/hr), and GPS coordinates across designated survey areas. Sites exhibiting emissions greater than 350 m^3/day, or within the top 35% of emitters, were prioritized for follow-up Optical Gas Imaging (OGI) surveys. This two-tiered approach allowed rapid identification of high-emission sources and efficient allocation of field verification resources. While aerial coverage enabled extensive site screening, data turnaround times exceeding 30 days limited the speed of leak response. Consequently, the method was effective for high-level detection and triage but required ground-based confirmation for compliance reporting and repair verification.

9.1.2 Mobile Screening (2024)

All truck-based mobile sensor surveys were conducted using a Boreal laser system Intricate' s field team performed the surveys by driving an Intricate truck around target areas, screening surface locations for methane leaks.

Boreal Laser Inc. is a company that develops and manufactures gas detection and measurement systems. Their GasFinder Instruments use a laser-based gas detection

principle called Tunable Diode Laser Absorption Spectroscopy (TDLAS) to measure and detect molecules of various gases, including methane.

The GasFinder-VB is a vehicle based mobile detection TDLAS system that provides fast response and recovery allowing for an independent result every second with no interference and no false alarms while targeting a specific gas.

The GasFinder-VB can be mounted on most modes of transportation. For the purposes of this project, Intricate Group will use a truck mount and possibly an all-terrain vehicle if there is no truck access to site using conventional vehicles.

Boreal participated in a 3-year study that was focused on reviewing existing and new methane emission technology and their suitability to be used in ALT-FEMP Programs. In addition to that, Boreal worked with the University of Waterloo and Arolytics to complete 2 field studies in 2023 at the CMC Research Site in Brooks, Alberta.

This study concluded that the Vehicle based TDLAS system is a suitable option for ALT-FEMP programs.

The Boreal Gas Finder Truck Mount TDLAS uses wavelength-modulated spectroscopy to infer the concentration based on an absorption line at 1654 nm (6046 cm-1).

The Boreal Gas Finder system can detect emissions as low as 0.6 ppm of methane and has a monitoring path from 5 to 500m. However, the lowest recommended actionable range (LRAT) is 3.3 ppm. The highest actionable concentration (HAC) is 2800 ppm. Detection above 2800 ppm will no longer be accurate however it is still an indication of a significant leak. There is a +/- 2% reading accuracy and it suitable for use in temperatures from -65 °C to +65 °C. The ability to detect emission is similar to other approved technologies such as Exact and PoMelo and we have assumed that this technology meets the 10 m3/d 90% PoD based on the feedback from the vendor and available data.

The truck mounted sensor technology offers relatively higher spatial resolution and sensitivity, enabling detection of leaks that may be missed by aerial surveys due to proximity or coverage limitations. However, the timing to complete truck-mounted mobile sensor surveys was considerably longer, resulting in fewer sites screened per day compared to aerial methods.

Despite the slower pace, truck-based surveys provided a valuable opportunity for field technicians to engage directly with operations personnel. This interaction fostered relationships that facilitated follow-up surveys and allowed technicians to receive real-time explanations from site operators about ongoing field activities—for example, when a site was temporarily offline or undergoing blowdown operations. Such contextual

information would be unavailable in aerial screenings and helped in interpreting sensor data more accurately.

9.1.3 Follow-up Survey Methodology

Optical Gas Imaging (OGI) follow-up surveys were conducted according to the ALT-FEMP modeling recommendations, with different criteria applied in 2023 and 2024:

- 2023: OGI follow-ups were performed only on sites flagged by the a-LiDAR screening with emissions exceeding 350 m^3/day or identified as part of the top 35% highest emitting locations.
- 2024: OGI follow-ups expanded to include all sites flagged with elevated methane levels, regardless of emission volume as determined by the Boreal ppm concentration that was exceeding 4 ppm. 4 was selected based on discussion with Borel, available local data and an Intricate trial that determined the average background methane emissions were 2.5 ppm and a threshold of 4 ppm would capture a statistically significant deviation from background.

At every location where an OGI survey was conducted, a consistent set of data was collected and logged electronically, regardless of whether fugitive emissions were detected. This data included ambient weather conditions, GPS coordinates, site photographs, and the date and time of the survey.

When fugitive emissions were detected, additional information was recorded, including the precise GPS coordinates of the leak, OGI video recordings, supplementary photos, and repair recommendations. Quantitative Optical Gas Imaging (QOGI) measurements were performed on every detected fugitive emission and recorded methane source to quantify emission rates accurately.

OGI follow up surveys were conducted by the same teams, type of equipment and field work flow in both 2023 and 2024. Generally, field operations were fully bought in to the field work by the last survey completion.

The effectiveness of any field LDAR / FEMP program is difficult to measure if fugitive emissions are not repaired in a timely manner, or are found year over year. The field work was completed as it should be, fugitives documented and operations notified and reported upon.

9.1.4 Data QA/QC

To ensure the integrity and defensibility of all screening and survey data, routine quality assurance and quality control (QA/QC) protocols were strictly followed. Starting in 2023,

all data was recorded electronically at the time of screening using offline-enabled systems, allowing field teams to capture information without relying on immediate network connectivity. Once a data connection became available, the collected data was securely uploaded to central servers.

Upon submission, datasets underwent prompt review, with any anomalies or outliers flagged for further investigation. These issues were addressed within 24 hours to minimize delays and maintain data reliability. This QA/QC process enables the rapid identification and correction of potential errors, supporting timely return-to-site actions if necessary. Collectively, these protocols uphold a high standard of data accuracy and reliability throughout the survey program.

10. Key Performance Indicators

The Alternative Fugitive Emissions Management Program (Alt-FEMP) demonstrated measurable improvements in detection performance, follow-up verification, and overall methane mitigation across both reporting years.

Over the two-year reporting period, emissions were detected at approximately 60% of all screened facilities, with verified fugitive emissions identified at more than 1,000 individual sites. The transition from aerial to ground-based screening enhanced detection fidelity, increased follow-up completion rates from 29% in 2023 to 51% in 2024, and improved overall leak localization accuracy. Integration of Quantitative Optical Gas Imaging (QOGI) further strengthened emissions quantification and ensured consistent data quality across all participating operators.

Collectively, these outcomes confirm that the Alt-FEMP achieved its core objectives of enhanced detection accuracy, verified emissions reduction, and regulatory compliance equivalency. The results demonstrate that combining advanced detection technologies with coordinated multi-operator implementation can deliver both environmental and operational benefits, providing a defensible model for large-scale methane management in Alberta’s upstream oil and gas sector.