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Acting Chair Allison Herren Lee
Securities and Exchange Commission
100 F Street NE
Washington, DC 20549

RE: Public Input on Climate Change Disclosures

Dear Acting Chair Lee:

Introduction

Kairos Aerospace appreciates the opportunity to comment on the Climate Change Disclosures request for comment for the Securities and Exchange Commission (“SEC”). As an advanced methane monitoring technology provider, Kairos Aerospace is on the front lines of innovation. Since 2013, Kairos Aerospace has provided a range of aerial solutions to oil and gas industry clients and stakeholders to better understand emissions and operational efficiency. Using the latest aircraft-based methane spectrometry, thermal infrared, and optical imaging technologies, Kairos’ proprietary data service identifies actionable opportunities for our customers to reduce emissions and improve field performance. Kairos currently operates full-time aerial surveys in North America.

To date, Kairos has surveyed over 262,000 facilities for methane emissions and we’ve helped our customers eliminate more than 18 billion cubic feet of methane emissions from oil and gas infrastructure in the United States and Canada.

As the SEC explores the appropriate mechanisms and requirements for climate-related disclosures, we wish to offer our perspective as leaders in understanding methane emissions from the oil and gas industry. By surveying hundreds of thousands of facilities, we have an unprecedented view of the nature, frequency, and distribution of methane emissions across the oil and gas value chain. Based on our findings, the evidence strongly demonstrates that actual emissions measurements, not self-reported data based on greenhouse gas inventories, should serve as the foundation for understanding a company’s or industry’s environmental performance. This is because there is often a wide gap between inventory estimates and real world measurements, which can lead to fundamental misunderstandings of emissions, their causes, and their solutions. We urge the SEC to emphasize measurement over engineering calculations in emission-related climate disclosures.

Limitations of Greenhouse Gas Inventories as a Risk Assessment Tool

Any approach to climate disclosure will need to account for the differences between industries. Kairos Aerospace is focused on measuring methane emissions for the oil and gas industry, and our comments are specific to that area. Other industries like cement manufacturing, power generation, mining, etc. all have their own unique environmental impacts and the approaches to disclosing climate risks and impacts should be tailored accordingly.



For example, emissions from the oil and gas industry are in many ways unique. First, the mix of emitted pollutants--methane, volatile organic compounds, nitrogen oxides, etc.--will be different for the oil and gas sector than other industries. Second, the nature of oil and gas production must be considered. The oil and gas industry doesn't just have a few large stationary sources that produce very large amounts of greenhouse gases. Production comes from millions of wells and facilities, connected by millions of miles of pipelines, any of which can occasionally be a significant source of greenhouse gas emissions.

This obviously presents policymakers with a significant challenge--how to evaluate the cumulative impact of these many small facilities as a whole. Often, the default approach is to rely on greenhouse gas (GHG) inventories, like the one assembled by EPA each year. Companies typically self-report data to a regulator, often on a yearly basis, that determines the amount of emissions they calculate their facilities emit each year. It offers consistent and easily comparable results that make it seem like an obvious choice for the foundation for climate disclosure.

However, there are several important drawbacks to the GHG inventory approach. First, there is typically a cutoff based on facility and company size. Many facilities and companies do not report to EPA's GHG inventory each year, and yet they can still be significant sources of GHG emissions. This is particularly important when climate disclosure is handled at a company level. Small companies will have incomplete data, and large companies will have holes in their own disclosures for their smaller facilities.

Second, GHG inventories are based on calculations and not measurement. They rely on emission factors, which are essentially an engineering estimate for what a typical component *ought* to emit. Often, these emission factors are based on decades-old data, and even worse, they do not properly account for leaks and equipment malfunctions. Based on our extensive experience, malfunctioning equipment can be very significant when looking at total GHG emissions. For example, based on our results from measuring hundreds of thousands of sites, we believe EPA's GHG inventory undercounts emissions by several multiples. Climate disclosure risk assessments that rely on GHG inventories as their basis may only capture 10-50% of actual GHG emissions, which is a significant problem.

Inventory underestimation may result from missing emissions due to equipment malfunction.

"We find that venting and malfunction-related emissions from tanks and other equipment leaks are the largest contributors to divergence with the GHGI."

Rutherford et al., 2021

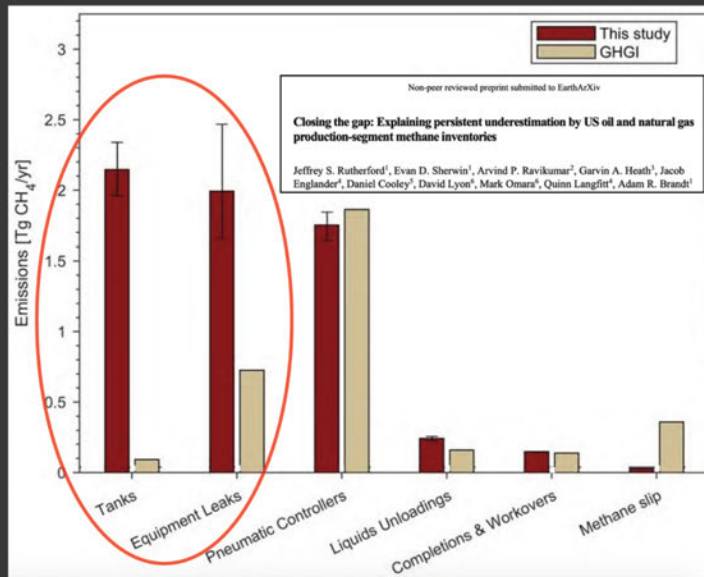


Fig. 1: Emission inventories often fail to accurately capture real-world emissions

Benefits of Measurement-Based Approach to Disclosure

Instead of relying on outdated emission factors and incomplete inventories, climate disclosure should be based on *measurement*. The question should be: what impact did your company have? And the only way to really answer that is through measurement. For example, Kairos often sees emission sources in the field that are emitting millions of cubic feet per day of natural gas that are not captured in any GHG inventory.

Take, for example, this unlit flare Kairos observed in the Permian Basin (Fig. 2). The false color plume depicts methane emissions. The optical imagery shows the emitting facility, and the nearby town provides a sense of the scale of this emission event. Kairos measured this miles-long plume of methane at 17,000 MCF per day, equivalent to over 8,870 tonnes of CO₂-equivalent *per day*.

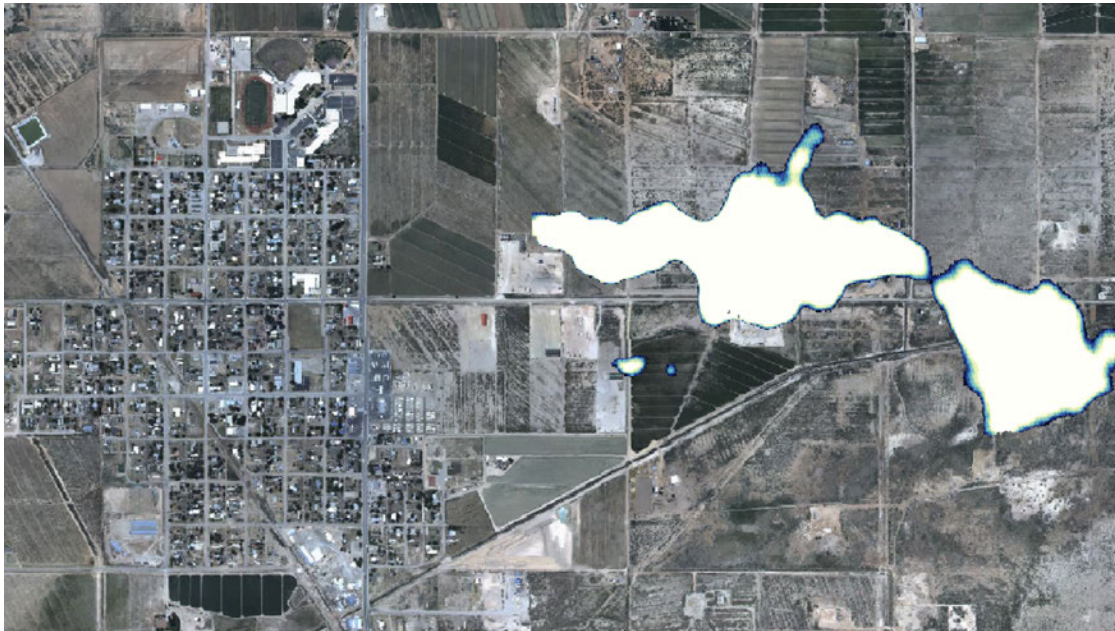


Fig. 2: Kairos detection of an unlit flare from an oil production facility

Events like these are relatively rare. Kairos sees these largest sources of emissions from about one in every 2,000 facilities we inspect. However, since we've inspected hundreds of thousands of sites, we can confidently say these types of emission events happen, and they are contributing about half of the total methane loss from oil and gas operations.

The reality is that the majority of facilities emit very little gas, as you might expect based on their emission inventory estimates. However, the scientific literature has found that a "fat tail" distribution of methane emissions means that the few large outlier sources of methane contribute the majority of total methane lost. It's the old 80/20 adage come to life in the context of emissions.

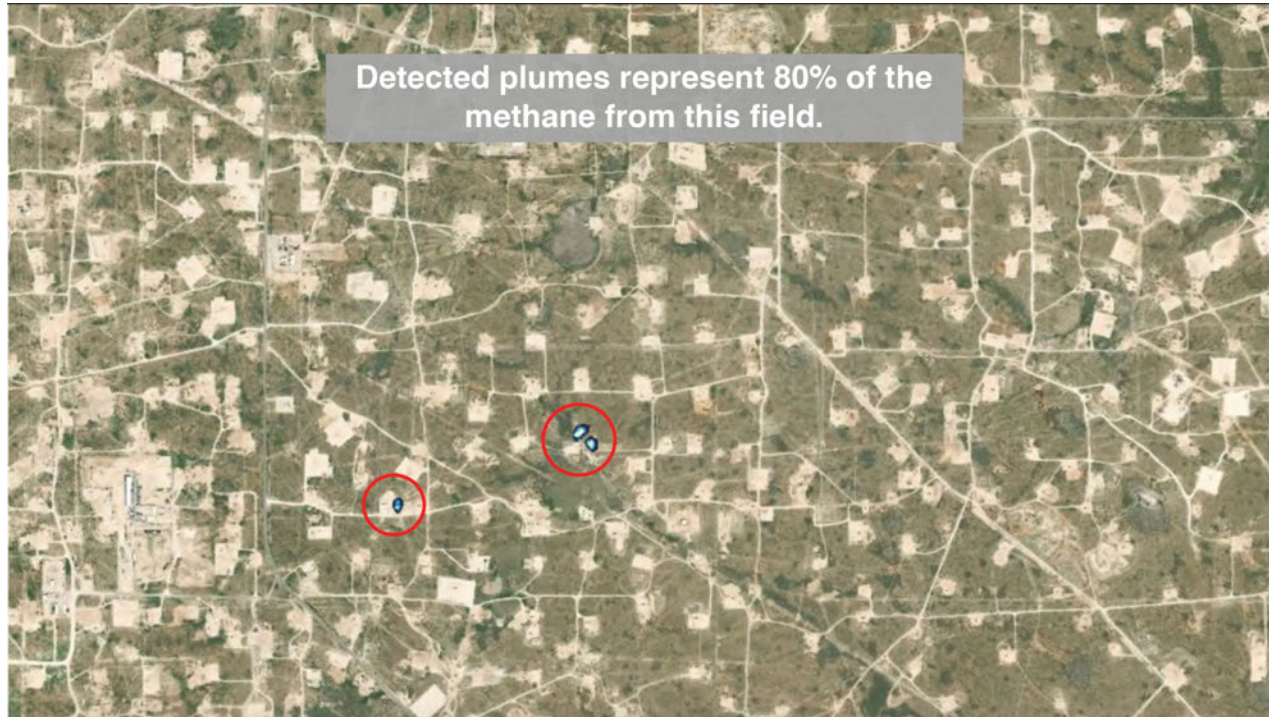


Fig. : Kairos surveyed this dense field for methane emissions and found just two sites that were contributing most of the total methane being emitted. This would not be captured within GHG inventory estimates.

Today's Technology Can Provide Better Climate Disclosure Risk Assessment

By requiring emissions measurement, we can ensure that climate disclosures accurately reflect the environmental risks and successes for businesses. For example, a measurement-based approach would make it clear which companies were the top performers from an environmental perspective and which were laggards.

One challenge to this approach has previously been that it's cost-prohibitive to measure sites for emissions. Measuring a site's emissions would take a ground crew several hours, and simply would not be possible for every facility in the country. Today, however, there are rigorously tested and economically viable emissions screening tools, such as the system used by Kairos Aerospace. Kairos has already surveyed facilities responsible for 20% of total US oil production, and in time the coverage and cost-effectiveness of these tools will grow. As other aerial, satellite, and continuous monitoring solutions enter the marketplace, the options for companies to cost effectively evaluate (and reduce) emissions will only continue to grow. The SEC can help foster this new technology development, ensure investors have better data to make decisions about climate risk, and encourage businesses to accelerate their investment in emission reductions by requiring companies to measure instead of calculate their emissions.

Other Considerations for the SEC

Question 2: What information related to climate risks can be quantified and measured?

Emissions can and should be quantified and measured, as they are the primary driver of anthropogenic warming. Emissions are also a major point of agency for oil and gas industry operators. While some



emissions are unavoidable, steps operators take to reduce or allow emissions will be one of the primary ways in which they can affect the climate impact of their operations.

Question 4: How should any such industry-focused standards be developed and implemented?

Since each industry has its own unique environmental footprint, industry-focused standards should be front and center to evaluating climate risks

In order to understand how industry-focused standards should be developed, there should be a measurement-based baseline assessment. It is impossible to set targets without first understanding what your emissions are and what drives them. Once you've established a baseline of what is actually driving climate impacts, you can effectively set standards and monitor progress towards meeting those climate goals.

Question 5: Are there any specific frameworks that the Commission should consider?

The SEC should be wary of some frameworks being circulated today, such as the Oil and Gas Methane Partnership (OGMP) 2.0 as it relies almost entirely on self-reported data based on engineering calculations instead of real-world measurements.

The OGMP 2.0 framework allows companies to repurpose incomplete greenhouse gas inventory data that may be based on outdated calculations. If these serve as the basis for climate evaluation, then any analysis of progress will likely miss the reality of what's happening in the field.

Question 9: What are the advantages and disadvantages of developing a single set of global standards applicable to companies around the world, including registrants under the Commission's rules, versus multiple standard setters and standards?

Given the unique considerations for each industry, a single set of global standards would be challenging to develop and implement. While methane emissions are an extremely important consideration for oil and gas production and processing, they would not be a relevant metric for say the aviation industry or timber. Similarly, each of these industries has its own environmental impact metrics that would be potentially not applicable to oil and gas production.

However, industry-focused standards that are applied globally could be a potentially valuable way to offer direct comparisons of companies within a particular space

Question 10: How should disclosures under any such standards be enforced or assessed?

The SEC should consider emphasizing third party assessments (i.e. not relying solely on company-reported data) for climate disclosure. This would bring consistency and transparency to assessing company performance and enforcement of standards, which would be extremely valuable in building public confidence in the data being collected.



Conclusion

Kairos appreciates the opportunity to provide input to the SEC as it evaluates climate risk disclosure requirements. Based on our extensive experience, we strongly recommend that the SEC not rely on flawed GHG inventory estimates as its metric for emission from the oil and gas sector. For a variety of reasons, inventory estimates can be incomplete and do not provide an accurate picture of emissions in the real world. This gap is reflected in a growing body of scientific literature.

Instead, we recommend the SEC rely on real world measurement of emissions. By measuring emissions from every site, we can ensure that the total environmental impacts are properly taken into account. It also provides a valuable metric to compare companies' relative performance to one another, as well as providing a roadmap to reduce emissions. Kairos Aerospace is one in a growing number of companies capable of performing these kinds of measurements using scientifically rigorous and cost effective methods.

We recommend this measurement-approach be tailored to specific industries, but then be applied consistently across that industry. This will strike an appropriate balance of granularity and data quality with flexible and consistent metrics that allow for straightforward comparisons between companies.

We would be happy to provide further feedback or lend our perspective on how measurement can underpin a new approach to climate risk disclosure.

Sincerely

Ryan Streams
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Kairos Aerospace