# Jacqueline Peterson

Thank you for considering the attached letter as you begin to form the OOOOc State Plan. In this letter we detail how liquid nitrogen is being used to effectively and affordably eliminate pneumatic venting at facilities of all sizes. We look forward to staying engaged throughout the process.

KATHAIROS™

23 December 2024

Program Supervisor, MC 205
Texas Register/Rule Development Team - Office of Legal Services
Texas Commission on Environmental Quality
P.O. Box 13087 Austin, Texas 78711-3087

RE: 2024-027-113-AI

To Whom It May Concern:

Thank you for the opportunity to provide feedback as Texas prepares state plans related to the federal Clean Air Act Section 111(d) emission guidelines and the implementation of Subpart OOOOc.

I am writing on behalf of Kathairos Solutions US, Inc., an environmental oil field services company with operations across the continental U.S., including at over 600 oil and gas facilities in Texas. We recognize the complexity of the challenge: on one hand, the oil and gas industry brings significant economic benefit to local communities and is directly responsible for the jobs that sustain hundreds of thousands of Texan families and households. Additionally, affordable energy and energy security are critical pillars of prosperity and economic opportunity. On the other hand, the methane that is commonly emitted from oil and gas production is one of the fastest accelerants of climate change. We acknowledge that methane comes from a variety of sources in the oil and gas industry and that some sources are more challenging to address than others. Luckily, **eliminating routine methane venting from pneumatic controllers and pumps can be done economically and at the scale needed to meaningfully reduce methane emissions from the oil and gas industry.**

We look forward to supporting the Texas Commission on Environmental Quality (TCEQ) in the development of the Section 111(d) State Plan. Methane emissions present an urgent and significant challenge. Fortunately, proven technologies, such as Kathairos' nitrogen-based solution, are affordable and can be scaled to meet the demands of the moment.

**About the Kathairos Solution:**

Kathairos' first solution uses nitrogen (N2) – an inert, nonpolluting gas – to drive pneumatic devices at remote wellsites, eliminating the practice of routine methane venting. The nitrogen effectively works as a replacement instrument gas on site and requires no external power. A specialized cryogenic tank is placed on site, filled with liquid nitrogen, and tied in to existing pneumatic systems. The nitrogen is then dispensed as a gas at the pressures and quantities needed for everyday operations. As the nitrogen depletes, the tanks are refilled by Kathairos dispatch units, similar to a propane model. The Kathairos

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solution is a simple and elegant way to eliminate pneumatic venting at sites of all sizes. With over 10 million operating hours to date, the units also have a proven uptime record of 99.985%.

As a result of its reliability and affordability, nitrogen has quickly become the preferred zero-vent solution across the oil and gas industry. Over the past two years, the company has scaled across North America, with nitrogen systems now active on over 2,100+ sites in 8 basins with 65+ of the country's largest oil and gas producers.

**Addressing Key Concerns:**

We expect that producers unfamiliar with existing options will voice concerns about the cost, pace, and feasibility of transitioning the industry to zero-vent pneumatics, as required under the new OOOOc emission guidelines. In response, we would like to emphasize the following points for your consideration as you begin to develop the State Plan:

*Cost:* Nitrogen systems provide an economical methane elimination solution for pneumatics, even for small, low vent wellsites.

- There are two cost inputs for the system: N2 tank rental and N2 consumed. The **cost of the system is directly commensurate with the amount of methane that otherwise would have been vented**. Small, low-vent wellsites are fitted with small (265L) tanks and consume small amounts of nitrogen, resulting in total compliance costs as low as $3,600 per year. Larger 40-well pads or compressor stations will be fitted with 3000L or 5500L tanks and use more nitrogen, but still have an abatement cost around $25/tCO2e.
- No up-front capital is required. Tank lease and nitrogen costs are paid on monthly basis.
- Oil and gas producers retain the fuel gas that otherwise would have been vented, which is conserved for future sale.
- Waste Emissions Charge (WEC) savings.
- **No need to replace existing pneumatic devices**; the nitrogen system simply ties in to existing systems, replacing methane for instrument power

*Feasibility:* Nitrogen provides a highly simple and reliable solution to eliminating the practice of routine methane venting.

- **Nitrogen systems require no on-site power, relying solely on thermodynamics!**
- No grid connection or solar set up is necessary, only road access is required.
- Nitrogen systems can convert all pneumatic devices simultaneously, as all devices are tied into a single nitrogen tank.
- With level sensors and on-site telemetry units, nitrogen systems provide **extremely accurate data** on methane mitigated. Given that it's a closed loop system, by tracking nitrogen consumption and applying a gas equivalence ratio, we can determine exactly how much methane otherwise would have been emitted. All this data is tracked in real-time and uploaded to Kathairos' cloud-based portal for producers to use for compliance and reporting purposes.

*Scalability:* The Kathairos nitrogen solution can be quickly scaled across industry.

- With 6 tank sizes ranging from 265L to 5500L, nitrogen can reliably and economically address well site facilities of all sizes, even remote one-well pads venting <100 scf/d.
- Kathairos has a contractual agreement with Chart Industries, a leading manufacturer of cryogenic industrial gas products. Chart Industries has the **capacity to produce thousands of specialized nitrogen tanks every month**, and can scale up as needed (they did this with oxygen tanks during the COVID-19 pandemic). Chart is headquartered in Georgia, with 7 offices in Texas.
- **No supply chain concerns**: the system has few parts and all tanks are manufactured in the USA.
- Nitrogen supply is readily available, with air separation facilities located in oil and gas producing regions across the USA. With air being the main feedstock, there are no concerns of supply issues or price fluctuation.
- Simple tie-ins, tanks can be installed and tied-in in half a day.
- Nitrogen distribution networks are already established in the Marcellus (WV, PA, OH), Permian (TX, NM), Eagleford (TX), Barnett (TX), Anadarko (OK), D-J (CO), Haynesville (LA, TX) and Bakken (ND) basins.

We cannot speak to the feasibility and cost of converting all methane sources which are contemplated under this rule. **However, eliminating venting from pneumatics is easy, affordable and should be considered the first step in any sensible emission reduction strategy**.

We look forward to continuing to partner with TCEQ and the Texas oil and gas industry to eliminate the practice of routine methane venting, while providing jobs, investment, and opportunities to communities across the U.S. Please do not hesitate to contact me with questions or for further clarification; I can be reached anytime at jpeterson@kathairos.com or 587-707-1143.

Sincere regards,

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Chief Climate Officer

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