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Attention Christina Sames, Erin Kurilla:

Thank you for your letter, dated December 15, 2023. The Pipeline Safety Trust welcomes your organizations' feedback on the report, *Safety of Hydrogen Transportation by Gas Pipelines*, prepared by Accufacts Inc. on our behalf.<sup>1</sup> We value the experience and expertise your organizations bring to this issue, and appreciate the input provided in your letter.

As you undoubtedly know, the Pipeline Safety Trust is a nonprofit organization dedicated to promoting pipeline safety with the objective of protecting people and the environment from adverse effects of pipeline incidents. To promote these interests, the Trust engages in education and advocacy by increasing access to information and building partnerships with residents, safety advocates, the government and industry to promote safer communities and a healthy environment.

With the expanded interest in using hydrogen as a means for decarbonizing our energy system, the Trust thought it important to get an evidence-based opinion on hydrogen integration in U.S. pipeline infrastructure. The objective in publishing this report is to educate the public and policymakers about the potential risks and benefits of transporting hydrogen in pipelines. The paper is by no means meant to pass as a scientific, peer-reviewed study. However, its conclusions are empirically based and represent the opinion of an expert in pipeline safety and hydrogen processing. Importantly, while AGA and APGA point to studies to describe hydrogen's behavior in a blend with methane, the Accufacts paper cites and uses many studies to arrive at its conclusions. For example, the University of California at Riverside Hydrogen Blending study, based on a comprehensive literature review, directly contradicts several AGA and APGA response statements on leakage and pipe integrity.

Given that most of the issues raised in AGA's and APGA's response can be addressed by the fact that the white paper was intended to be an evidence-based, expert opinion, and the fact that the paper cites studies that contradict AGA's and APGA's responses, we do not intend to go through the response point-by-point, but rather add some context to some of the issues raised.

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<sup>1</sup> Richard B. Kuprewicz, *Report: Safety of Hydrogen Transportation by Gas Pipelines* (Nov. 28, 2022)  
<https://pstrust.org/wp-content/uploads/2022/11/11-28-22-Final-Accufacts-Hydrogen-Pipeline-Report.pdf>.

We wish to reply to the following points mentioned in your letter:

**I. Historic use of town/coal gas does not guarantee safety in modern natural gas distribution systems.**

It is true that in the past, artificial gas blends were distributed to customers that included percentages of hydrogen. However, over time, this practice has largely been phased out as safety and pipeline integrity practices improved. The use of artificial gas in Hong Kong or hydrogen in the United Kingdom or Hawaii is not necessarily comparable to distribution systems in the continental U.S., nor does it negate the scientific fact that introducing hydrogen into households could place the public at risk. For example, gas utility customers in Hawaii likely have lower gas needs from heating systems than most other Americans and have better ventilation, including frequently open windows, mitigating buildup of escaped gases.

**II. U.S. natural gas distribution systems are not “leak tight.”**

U.S. natural gas transmission and distribution systems are aging and leaky. According to EPA data, natural gas transmission and distribution systems account for 26% of methane emissions in the U.S.<sup>2</sup> Unfortunately, this data is likely an underestimate, as recent studies have found that EPA’s data vastly underrepresents actual emissions by as much as 60%.<sup>3</sup> In fact, one recent study found there are 659,000 leaks from natural gas pipeline mains in the U.S. alone.<sup>4</sup> It is not a stretch to say that if hydrogen was blended into these systems, particularly distribution systems, that leakage would be a major problem. Describing a molecule as “slippery” explains its physical ability to stay contained. More than just the size of the molecule, hydrogen’s low viscosity and other physical factors lead to its categorization of “slippery”, meaning difficult to keep from leaking.

**III. Many of the factors identified by AGA/APGA would remain constant and/or be aggravated by blending hydrogen into distribution systems.**

AGA/APGA are correct that DIMP requires operators to determine and mitigate risks in distribution systems. However, these risks would remain and/or be aggravated by blending hydrogen into these systems due to its greater flammability, explosivity, and other unique attributes. For example, many of the integrity factors mentioned in your letter, such as the age of the pipeline, the pipeline’s material, the pipeline’s environment/location, maintenance, diameter, pressure, and location are also relevant factors in considering whether blending hydrogen is feasible and worth introducing greater risks.

Further, the threat of excavator damage and other outside forces are also relevant to hydrogen distribution. If it is true that excavation damage and other outside forces make up more than 60% of distribution incidents, this would likely remain constant regardless of whether hydrogen is in the system

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<sup>2</sup> U.S. Evtl. Prot. Agency, *Estimates of Methane Emissions by Segment in the United States* (May 5, 2022) <https://www.epa.gov/natural-gas-star-program/estimates-methane-emissions-segment-united-states#Transmission>.

<sup>3</sup> Environmental Defense Fund, *Methane Research Series: 16 Studies* <https://www.edf.org/climate/methane-research-series-16-studies>.

<sup>4</sup> Zachary D. Weller, Steven P. Hamburg, and Joseph C. von Fischer, Correction to “A National Estimate of Methane Leakage from Pipeline Mains in Natural Gas Local Distribution Systems”, *Environ. Sci. Technol.* 2021, 55, 1, 805–806 (Dec. 17, 2020) <https://pubs.acs.org/doi/pdf/10.1021/acs.est.0c08130>.

but notably incidents *could be much worse due to hydrogen's highly flammable, explosive, and hot burning temperature.*

Finally, it is important to note that the science of hydrogen blending is still developing—and that many experts in this field express that caution should be exercised with respect to the use of hydrogen and natural gas mixtures. In particular, the CSA Group recently put out the following statement:

It is our hope that, until appropriate standards and certification programs are in place, gas utilities and other suppliers of natural gas will abstain from blending hydrogen with natural gas for use with products only certified for natural gas. We urge utilities, regulatory authorities, certification bodies, and manufacturers of gas appliances to work together to ensure that the use of any mixture of hydrogen and natural gas in natural gas products take place *only after the ongoing research is complete, the standards are amended, and products can be certified to the amended standards.*<sup>5</sup>

Thank you again for the opportunity to hear from your organizations on this important issue. It is the Trust's intention to merely ensure that a transition to a clean energy economy does not place the public or the environment at increased risk, and that well-intentioned actions taken to abate climate change are effective. With respect to hydrogen distribution to private citizens' homes, we question whether the risk outweighs the benefit, particularly given the availability of electrification as an alternative, and sought more information on hydrogen safety in commissioning this report. Importantly, we stand by the integrity and quality of this report. If you wish to discuss this letter or arrange a meeting, please feel free to contact me anytime. In the interest of transparency, we will post your letter and our response on our website alongside the Accufats Inc. report.

Sincerely,

A handwritten signature in blue ink, appearing to read "Bill Caram".

Bill Caram  
Executive Director

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<sup>5</sup> CSA Group, *Use of Hydrogen and Natural Gas Mixtures in Products Certified for Natural Gas in Canada and the US* <https://www.csagroup.org/article/use-of-hydrogen-and-natural-gas-mixtures-in-products-certified-for-natural-gas-in-canada-and-the-us/> (CSA Group is the standard setting organization for the country of Canada, similar to the American National Standards Institute (ANSI)) (emphasis in original).