BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Adopt Biomethane Standards and Requirements, Pipeline Open Access Rules, and Related Enforcement Provisions	Rulemaking 13-02-008 (Filed February 13, 2013)

REPLY COMMENTS OF THE NATIONAL FUEL CELL RESEARCH CENTER, GREEN HYDROGEN COALITION, AND CALIFORNIA HYDROGEN BUSINESS COUNCIL TO THE ADMINISTRATIVE LAW JUDGE'S RULING SEEKING COMMENTS REGARDING CONTINUED BIOMETHANE PROCUREMENT REPORTING AND REGARDING UC RIVERSIDE SAFE HYDROGEN INJECTION STUDY

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September 2, 2022

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In accordance with the Rules of Practice and Procedure of the California Public Utilities Commission ("Commission"), the National Fuel Cell Research Center ("NFCRC"), the Green Hydrogen Coalition ("GHC"), and the California Hydrogen Business Council ("CHBC") (together "Joint Parties") hereby submit reply comments on the Administrative Law Judge's ("ALJ") Ruling Seeking Comments Regarding Continued Biomethane Procurement Reporting and Regarding UC Riverside Safe Hydrogen Injection Study ("Ruling") filed on July 18, 2022.

I. INTRODUCTION

The Joint Parties file these reply comments addressing the opening comments of other parties. While the opening comments address several questions in response to the ALJ Ruling, the Joint Parties focus here on issues relevant to leakage as well as the definition of renewable hydrogen.

II. COMMENTS

a. Based on the Evidence in the UC Riverside Study, Hydrogen can be Safely Blended at Levels Below 5% and is Operationally Feasible

As verified by the various hydrogen blending studies and projects reviewed in the UC Riverside Study ("Study"), there is ample evidence that hydrogen has been and can be safely blended into the natural gas pipeline system at levels at or below 5% by volume without safety or operational concerns. Blends above this level require further validation. Comments by the Environmental Defense Fund ("EDF") and Sierra Club opposing the establishment of *any* blend

limit for hydrogen are inconsistent with both the findings of the Study and with the long-term safe operation of gas systems such as Hawai'i Gas, as noted below. The Joint Parties support establishing a blend limit of 5% immediately, in keeping with the findings of the Study. This step is necessary to begin collecting operating data and experience to pave the way for the potential widespread adoption of hydrogen as a decarbonization strategy as envisioned in the Air Resources Board Scoping Plan and numerous national and international studies. To be consistent with the goal of the Newsom administration to establish a hydrogen hub in California, the Commission should not delay in taking this first step of setting a blending standard. The Joint Parties concur with the utilities opening comments[1] that support testing and studying hydrogen blends above 5% by volume with the goal of establishing a standard that maximizes the potential for hydrogen injection while also ensuring safety and reliability.

The two issues raised in opposition to establishing a 5% blend limit at this time are leakage and global warming. There has been much discussion recently about the need to manage leakage in systems conveying pure hydrogen to avoid the risk of incidents and prevent the potential secondary global warming impact that hydrogen can have due to reactions with other species in the atmosphere. While these are important concerns, the Joint Parties identify three reasons why they should not be of concern here. First, any leakage of hydrogen in the place of methane leads unquestionably to a reduction in global warming potentials. Second, whether hydrogen will leak at a faster rate than methane in typical gas infrastructure is still a matter of scientific debate. Third, these concerns are not relevant at a 5% blend level on the natural gas system since the evidence shows that a 5% blend will have no significant safety or operational concerns.

The evidence, as presented in the Study, shows that data is mixed on whether hydrogen-methane blends leak more rapidly than pure methane through the types of leaks found in the natural gas system. Laboratory measurements and supporting analysis by the University of California, Irvine ("UCI") found that methane-hydrogen blends leak at the same rate as pure methane through typical threaded pipe fitting in the gas system. Other studies find increased leakage rates as hydrogen fraction increases because hydrogen reduces the viscosity of the mixture. Regardless, at a 5% blend fraction, this effect would be inconsequential both from a safety and global warming

[1] Comments of Southern California Gas Company (U 904 G), San Diego Gas & Electric Company (U 902 G), Southwest Gas Corporation (U 905 G), and Pacific Gas and Electric Company (U 39 G) on Administrative Law Judge Ruling Seeking Comments Regarding UC Riverside Safe Hydrogen Injection Study.

perspective. In addition, establishing a 5% standard would facilitate measurement of leak rates from in-service equipment to understand the phenomena throughout in consideration of moving to higher limits.

Illustrative of the ability to blend hydrogen into the natural gas supply without negative consequences, Keele University in the United Kingdom successfully blended 20% by volume with natural gas in a pilot between 2019 and 2021.[2] After extensive laboratory testing and piloting on the effects of hydrogen blends in home appliances, businesses, and existing gas infrastructure, the results of the pilot concluded that a hydrogen blend of 20% by volume did not negatively impact the network pipes, boilers, hobs, cookers, or meters in this study.

Due to the success at Keele University, a larger project was deployed in Winlaton, Gateshead in 2021 over the course of ten months.[3] This project powered over 668 homes, a school, businesses, and a church with a 20% hydrogen blend by volume, all while the Health and Safety Executive ("UK") checked for health and safety issues. The results of this project were also successful, illustrating the safety of blending hydrogen at 20% by volume.

In the United States, operating experience further validates the feasibility of deploying hydrogen-natural-gas blends. Hawai'i Gas has safely operated with a gas supply containing up to 15% hydrogen by volume in their existing natural gas pipeline network. The Hawai'i Gas' hydrogen blend is not a demonstration; this real-world application supports the decarbonization of the State's 1,100 miles of pipelines.[4] The State's experience with safe operation over decades with a gas supply containing a significant fraction of hydrogen has led to research and development of hydrogen and supporting technologies for other end uses to decarbonize the State.

California must take the steps necessary to move beyond 5% injection through expeditious analysis and testing of lesser blends in the field and controlled testing at higher blends, up to 100% hydrogen, to meet the State's decarbonization and air quality goals. Achieving the State's net-zero goals[5] will require progressive testing and demonstrations that will lead to a completely decarbonized pipeline system. Moving beyond 5% injection by volume, which has been

[2] Keele University. "HyDeploy." https://www.keele.ac.uk/sustainable-futures/ourchallengethemes/providingcleanenergyreducingcarbonemissions/hydeploy/. Accessed September 2, 2022.
[3] HyDeploy. "Winlaton Trial." https://hydeploy.co.uk/project-phases/. Accessed September 2, 2022.
[4] https://www.hawaiigas.com/clean-energy/decarbonization
[5] Section 38562.2 Health & Safety Code. (Net zero)

established as a safe injection standard, is critical to deploying the next stage in hydrogen blending and achieving complete decarbonization.

b. The Joint Parties ask that the Commission Adopt the Definition Proposed by the Joint Utilities and Provide Eligibility Clarity for Electrolysis Powered by Behind-The-Meter Renewable Resources or Grid Power Containing Large Hydro Generation

In opening comments, the Joint Parties proposed that the Commission define "renewable hydrogen" to mean hydrogen where all energy inputs and feedstock used in the production and delivery of the hydrogen are consistent with the California Renewables Portfolio Standard Program ("RPS") (Article 16 (commencing with Section 399.11) of Chapter 2.3). Any electricity used shall be from an eligible renewable energy resource, as defined in Section 399.12. Any nonelectric energy input or feedstock shall be from a source included in paragraph (1) of subdivision (a) of Section 25741 of the Public Resources Code.

After reviewing the opening comments from other Parties, we believe that our proposed definition and overall viewpoint align with many in this Proceeding. Precisely, our definition aligns well with the definition set forth by Southern California Gas Company ("SoCalGas"), San Diego Gas & Electric Company ("SDG&E"), Southwest Gas Corporation ("Southwest Gas"), and Pacific Gas and Electric Company ("PG&E") (collectively, the "Joint Utilities").[6] However, we believe that the Joint Utilities provide greater detail in their proposed definition. As a result, we submit that their definition is a more practical way to develop a foundational renewable hydrogen definition. Therefore, we recommend that the Commission adopt the definition proposed by the Joint Utilities.

The Joint Parties also ask that the Commission explicitly allows electrolysis powered by behind-the-meter renewable resources or grid power containing large hydro generation to count as eligible renewable hydrogen projects. Many current behind-the-meter electrolyzer projects use net metering for procuring/affording solar power and are not a part of RPS, as the Joint Utilities proposed definition would require (e.g., the Joint Utilities' definition only addresses utility-side electrolyzers). Thus, eligible renewable hydrogen projects should also include co-located non-grid connected electrolysis, large hydro, (for grid-connected electrolysis that wants to count the carbon credit of legacy hydro), and curtailed renewables (for electrolysis that can use otherwise curtailed renewables that are not being counted towards RPS).

[6] See the Joint Utilities Opening comments. p. 11

Therefore, the Joint Parties ask that the Commission both adopt the definition proposed by the Joint Utilities and provide eligibility clarity for electrolysis powered by behind-the-meter renewable resources or grid power containing large hydro generation.

III. CONCLUSION

The Joint Parties appreciate the opportunity to submit these reply comments to the Ruling and look forward to working with the Commission and stakeholders in this proceeding.

Respectfully submitted,

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September 2, 2022