BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

Application of Southern California Gas Company (U 904 G), San Diego Gas & Electric Company (U 902 G), Pacific Gas and Electric Company (U 39 G), and Southwest Gas Corporation (U 905 G) to Establish Hydrogen Blending Demonstration Projects.	A.22-09-006 (Filed September 8, 2022)

RESPONSE OF SOUTHERN CALIFORNIA GAS COMPANY TO APPENDIX B OF ASSIGNED COMMISSIONER'S SCOPING MEMO AND RULING

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Pursuant to the Assigned Commissioner's Scoping Memo and Ruling (Scoping Memo) issued on June 12, 2025, and the E-Mail Ruling Granting Joint Motion Requesting Extensions of Time to Serve Prepared Testimony issued on July 8, 2025, Southern California Gas Company (SoCalGas) respectfully submits its responses to Appendix B of the Scoping Memo.

I. INTRODUCTION

SoCalGas appreciates the opportunity to respond to important questions posed in Appendix B of the Scoping Memo. SoCalGas is providing the responses below in the context of the main issues identified in the Scoping Memo as follows: (1) Do the pilots conform to regulatory requirements? (2) Are the pilots useful and well designed? (3) Are the pilots prudent? (4) Are the pilot projects safe? (5) Are the pilots equitable and do the pilots create any new positive or negative community impacts?[1] To help the Commission and parties learn more about SoCalGas's proposed projects, SoCalGas responds below with these issues in mind.

SoCalGas does not expect any end-user equipment issues in its proposed projects. As noted below, various research has concluded that typical appliances are not affected by hydrogen blends up to 20%.[2] With respect to Orange Cove, SoCalGas is nonetheless proposing to provide

[1] Scoping Memo at 11-12, *available at*: https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M569/K149/569149777.PDF.

[2] CPUC, *Hydrogen Blending Impacts Study* (July 18, 2022) at 8, *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M493/K760/493760600.PDF, *see also*

courtesy appliance inspections to customers before blending begins to confirm they are working properly. Currently, SoCalGas's gas infrastructure ends at the customer's meter, and any customer equipment is beyond SoCalGas's ownership and control.[3]

With respect to appliances that are found to be malfunctioning and beyond SoCalGas's standard mitigation efforts, SoCalGas intends to inform Orange Cove customers about customer assistance and energy efficiency programs to help replace them. Doing so will leverage existing Commission programs to promote the cost-effective implementation of the demonstration in Orange Cove, a disadvantaged community. Proposing prudent demonstration projects that confer benefits to ratepayers is a key driver in SoCalGas's proposals.

SoCalGas designed the proposed demonstration projects to balance affordability with the need for robust safety and meaningful research outcomes. While modest bill impacts are anticipated due to project cost recovery, SoCalGas remains open to stakeholder suggestions that enhance safety—provided they offer tangible benefits and are cost-justified. Importantly, blending hydrogen can decrease emissions from existing end uses without forcing customers to replace their appliances. Safety remains foundational, and cost effectiveness and ratepayer value are essential considerations.

SoCalGas is committed to working with its customers, end users, and vendors throughout the proposed demonstration projects. SoCalGas has proposed various methods to monitor safety, educate stakeholders, and evaluate customer facilities before, during, and after the introduction

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Rulemaking (R.) 13-02-008, Compendium Report; Hydrogen Blending Compendium Report, Literature Review at 65-66, *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M556/K896/556896659.PDF.

[3] *See* SoCalGas Tariff Rule No. 13.A ("All meters, regulators, service pipe, equipment, fixtures, etc., installed by the Utility on the customer's premises for the purpose of delivering gas to the customer, with the exception of pipe installed by the Utility beyond the meter, shall continue to be the property of the Utility and may be repaired or replaced by the Utility at any time"), *available at*: https://tariffsprd.socalgas.com/view/tariff/?utilId=SCG&bookId=GAS&tarfKey=112; *see also* SoCalGas Tariff Rule No. 26.A ("The Consumer shall, at the Consumer's own risk and expense, furnish, install and keep in good and safe condition all Consumer's Equipment, as defined in Rule No. 1. The Company shall not be responsible for the selection, installation, operation, maintenance or condition of any Consumer Equipment or for any injuries or damages resulting therefrom…"), *available at*: https://tariffsprd.socalgas.com/view/tariff/?utilId=SCG&bookId=GAS&tarfKey=125.

of hydrogen to the system through the courtesy inspections, measures, and outreach outlined in SoCalGas's testimony,[4] including but not limited to[5]:

- Odorant sampling to confirm blending hydrogen does not affect the efficacy of current natural gas odorant.
- Hydrogen safety education for residents, students and first responders.
- Offering courtesy inspections of end-use customer equipment to confirm behind-the-meter equipment present is free of leakage and is operational, both prior to the introduction of hydrogen and during the demonstration period.
- Conducting pre-, during, and post-implementation leak surveys.
- Installing automatic and remote shutdown capabilities for the hydrogen production and blending facility in case an alarm is triggered or a leak is detected.
- Testing the operations of end use equipment.

SoCalGas looks forward to receiving constructive feedback from Orange Cove and UC Irvine customers, parties, and stakeholders.

II. RESPONSES TO SOCALGAS PROJECT-SPECIFIC QUESTIONS

A. Orange Cove Distribution Project (SoCalGas)

1. What is the existing baseline risk of an incident related to the medium pressure system leading to Asset Failure within the 2,000 residences and 100 commercial facilities proposed to be part of this pilot project? How was, or will, this baseline risk be established?

For multiple reasons, as listed below, a baseline risk assessment of residential and commercial end use equipment and plumbing was deemed unnecessary and was not performed nor proposed as part of the demonstration project.[6] As a starting point, the anticipated risk at the

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[4] Prepared Direct Testimony of Blaine Waymire on behalf of SoCalGas SoCalGas's Hydrogen Blending Demonstration – Open System Project) (Chapter 2) at 11.

[5] Prepared Direct Testimony of Blaine Waymire on behalf of SoCalGas (SoCalGas's Hydrogen Blending Demonstration – Closed System Project) (Chapter 1R) at 13-17.

[6] SoCalGas interprets "within the 2,000 residences and 100 commercial facilities" to refer to end use equipment and internal piping located inside customer buildings.

proposed hydrogen blending levels is extremely low, and the following research supports that conclusion:

- The U.S. Department of Energy (DOE) has determined that hydrogen is as safe as other fuels like natural gas.[7]
- The Hydrogen Impact Study, commissioned by the CPUC, summarized that hydrogen blends of up to 5% are generally safe.[8]
- The Hydrogen Blending Compendium Report (Compendium Report) found that common appliances can operate safely with blends up to 20% hydrogen.[9]
- The Canadian Standards Association (CSA) Group, a leading certification body in North America, confirms that existing product certifications remain valid with natural gas blends of up to 5% hydrogen.[10]

The Orange Cove demonstration is planned for hydrogen blending of 0.1-5%, which falls well within the thresholds supported by these safety research and certification standards.

In addition to these established safety findings informing the extremely low hydrogen blending level at Orange Cove, a baseline risk assessment was not necessary for the following reasons:

(1) Several factors support the conclusion that SoCalGas's Risk Assessment and Mitigation Phase (RAMP) analysis sufficiently addresses risk for the scope and scale of the proposed demonstration. SoCalGas evaluates baseline risk for asset failure of their medium pressure system as outlined in the RAMP report with an established

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7 DOE, *Hydrogen Safety*, *available at*: https://www1.eere.energy.gov/hydrogenandfuelcells/pdfs/h2_safety_fsheet.pdf.

8 CPUC, *Hydrogen Blending Impacts Study* (July 18, 2022) at 4, *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M493/K760/493760600.PDF.

9 *Id*. at 8 *see also* R.13-02-008, Compendium Report; Hydrogen Blending Compendium Report, Literature Review at 65-66, *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M556/K896/556896659.PDF.

10 ASGE, *CSA Group Revised Position on Certifying Hydrogen & Natural Gas Products in Canada and the US – Recognizes Acceptability of Natural Gas Containing Up to and Including 5% of Hydrogen* (December 12, 2022), *available at:* https://asge-national.org/agaupdate-20230428/#:~:text=Update%20on%20End%20Use%20Codes,of%20hydrogen%20with%20natural%20gas.

threshold of annual probability greater than 6 x 10-6 of a serious incident[11]. Commercial and residential end use systems generally operate at significantly lower pressures (< 5PSI) than the medium pressure system (< 60PSI) addressed within RAMP and therefore present even lower inherent risk. Lastly, given that this is an 18-month demonstration and not permanent, additional assessment at the end use level is not anticipated to provide materially different insights.

(2) Currently, SoCalGas's infrastructure ownership ends at the gas meter; facilities and appliances beyond a customer's meter are beyond SoCalGas's ownership and control. When SoCalGas supplies fuel to customers, it operates under the assumption that residential and commercial equipment comply with applicable codes designed to facilitate the safe receipt of gas service. Customers are also required to furnish, install and keep in good and safe condition all of their equipment.[12]

(3) Affordability of the overall project costs is an important consideration. The proposed project costs reflect the scope as defined in D.22-12-057.

(4) Furthermore, SoCalGas has successfully performed hydrogen blending in multiple demonstration settings.[13]

SoCalGas is committed to working with its customers, end users, and vendors to assess existing end use equipment and ahead of the demonstration project and will work with customers to inspect end use equipment that will receive the blended gas.

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[11] *See* 2025 Risk Assessment Mitigation Phase (RAMP) Report, available at https://www.socalgas.com/sites/default/files/2025-05/SCG-RAMP-REPORT-final.pdf.

[12] *See* SoCalGas Tariff Rule No. 26.A ("The Consumer shall, at the Consumer's own risk and expense, furnish, install and keep in good and safe condition all Consumer's Equipment, as defined in Rule No. 1").

[13] *See* UC Irvine, *In a national first, UCI injects renewable hydrogen into campus power supply* (December 6, 2016), *available at*: https://news.uci.edu/2016/12/06/in-a-national-first-uci-injects-renewable-hydrogen-into-campus-power-supply/; SoCalGas, *SoCalGas Among First in the Nation to Test Hydrogen Blending in Real-World Infrastructure and Appliances in Closed Loop System* (September 30, 2021), *available at*: https://www.socalgas.com/newsroom/press-release/socalgas-among-first-in-the-nation-to-test-hydrogen-blending-in-real-world; *see also* SoCalGas, *[H2] Innovation Experience*, *available at*: https://www.socalgas.com/sustainability/hydrogen/h2home.

2. **Does SoCalGas have reliable, extensive knowledge of the pipeline materials, types, mileage, welding/joining methods, etc., of the portion of the California gas infrastructure proposed to be part of this pilot project?**

SoCalGas has developed reliable and extensive knowledge of its pipeline system – including the portion of the California gas infrastructure proposed as part of this demonstration project –through over 150 years of expertise in developing pipeline infrastructure, supporting 21 million customers, and operating and maintaining over 100,000 miles of distribution pipeline. As such, SoCalGas has extensive data on materials, pipe size, installation year, operating pressure, mileage and detailed meter data for the portion of SoCalGas's infrastructure proposed as part of this demonstration. SoCalGas's specifications align with federal and state pipeline safety regulations and industry best practices across design, construction, operation, and maintenance. SoCalGas would reference requirements on welding and joining methods based on pipe vintage and pipe size-based joining/welding standards from the installation time frame.

3. **Statistically, is it necessary for this pilot project to include as many buildings and structures as SoCalGas proposes? Could a smaller sampling still be representative of a meaningful portion of the statewide gas infrastructure? How small?**

It is optimal to include the entirety of the Orange Cove community in this demonstration project in an effort to simulate blending to the broader SoCalGas distribution system, while containing the blended fuel to a controlled area. Including all end users and facilities in the service area allows for diverse end uses while maintaining a centralized gas supply. It would not be prudent nor cost effective to conduct the demonstration on a smaller sampling.

Performing the demonstration on a smaller section of the Orange Cove community would reduce the amount of useful data, be inconsistent with D.22-12-057, and likely increase costs. If SoCalGas were to decrease the sample size of the project within Orange Cove, the project would be less representative of a "system using typical equipment and materials found in California's gas infrastructure," as required in D.22-12-057.[14] With respect to potentially increasing project

[14] D.22-12-057 at 62 (Conclusion of Law 17).

costs, SoCalGas would have to find another means of isolating portions of the system. An alternative would require a full reevaluation of the Orange Cove system demonstration project.

Carving out just a portion of the Orange Cove system would reduce the efficacy of potential data that will be gathered at the regulator station. The City of Orange Cove is served by a medium pressure system with a single interconnection that controls gas to the local area, making it an ideal location for controlled evaluation and unique in the makeup of system design. Pending a finalized data collection plan with an independent third party, SoCalGas intends to monitor data from the single regulator station that controls gas delivered to the area.

In addition, sectionalizing a portion of the Orange Cove community would leave out gas system components that may not be captured in a smaller area. The entirety of the Orange Cove system includes a variety of pipeline attributes found throughout the State. The system utilizes nine different meter sizes throughout the city, has distribution mains of various materials that range in installation year from 1946 - 2022, and has mains that range from one to six inches.

4. **Are the gas appliances, and the uses of those appliances in the 2,000 residences and 100 commercial enterprises in Orange Cove, comparable to a large enough number of residential and commercial customers throughout California to be meaningful?**

Yes, the Orange Cove community was carefully selected for this demonstration project because it contains a large sample of gas appliances that is expected to be reasonably representative of the larger customer base throughout California.

With respect to residential appliances, this is due to the variety of home construction years and gas uses/purposes in the city. The homes in Orange Cove have service line dates of installation ranging from 1946-2022 and are composed of both single and multifamily residential dwellings. In addition, average gas usage in the Orange Cove community is close to average residential usage across the SoCalGas territory, suggesting similar usage patterns in the community. SoCalGas will offer courtesy home inspections to the approximately 2,000 residences, which will allow collection of data on the appliances and build an inventory of the residential appliances in Orange Cove.

Similarly, the Orange Cove commercial community includes many similarities to commercial gas users across the State. Orange Cove includes common commercial and non-residential buildings, such as restaurants, schools, businesses, and places of worship. Industries

present in the community include agriculture, utilities, manufacturing, retail, professional services, education, health care, and food services. This provides a cross section of common commercial business types that are representative of many communities across California that would be meaningful for comparison. SoCalGas intends to collect data on appliances in approximately 100 commercial enterprises during proposed courtesy inspections and build an inventory of the commercial appliances in Orange Cove.

5. **How will the existing condition of the gas appliances in the pilot project be established? What is the estimate of the number of residences and businesses who will impede SoCalGas's efforts to examine and monitor their gas appliances? How will condition problems with gas appliances that arise after the start of the test period be identified and accounted for? Does the test protocol call for leaving condition problem that arise during the test untreated? If so, what effect will that have on safety?**

How will the existing condition of the gas appliances in the pilot project be established?

Existing condition of gas appliances in the demonstration will be established through courtesy inspections. SoCalGas does not anticipate condition problems arising as a result of the demonstration project and is not aware of any appliances that cannot function with 5% hydrogen blend[15]. As stated in more detail in the Introduction and Section A.1, courtesy inspections and enhanced safety and risk mitigation measures will be included throughout the demonstration project to determine the condition of the existing gas appliances and verify they are in safe operating condition.

What is the estimate of the number of residences and businesses who will impede SoCalGas's efforts to examine and monitor their gas appliances?

SoCalGas is unable to reasonably estimate how many residents and businesses will accept courtesy inspections and monitoring. However, based on SoCalGas's extensive community engagement activities outlined in Section A.9, the Company will work with

[15] This statement is based on currently available research, appliance certification standards, and SoCalGas's internal assessments. It does not constitute a warranty or guarantee of appliance performance. Actual appliance compatibility may vary depending on age, condition, and manufacturer specifications. SoCalGas will continue to monitor and evaluate appliance performance throughout the demonstration period.

residents, city officials, and community leaders to conduct enough voluntary inspections and monitoring to gather relevant end use information.

The Commission has been a strong leader in educating and encouraging decarbonization efforts in alignment with the State's goals, including those that directly impact residences and businesses. Those continued efforts as part of this proceeding and stakeholder engagement, and ultimately the Commission's decision and requirements in authorizing these demonstration pilots, can meaningfully alleviate such impediments so that participating customers can understand the safety and decarbonization goals and value of the projects.

How will condition problems with gas appliances that arise after the start of the test period be identified and accounted for?

Safety is a core value at SoCalGas and appliances found to be unsafe will be red tagged and disconnected. Based on currently available research, appliance certification standards, and SoCalGas's internal assessments, SoCalGas is not aware of any appliances that cannot function with 5% hydrogen blend[16].

Issues with gas appliances that arise during the demonstration will be addressed and documented on a case-by-case basis, in accordance with SoCalGas's existing processes and procedures. Today, customers who experience appliance issues with traditional natural gas can call SoCalGas's dedicated customer service representatives to have a customer service technician troubleshoot their equipment.[17] A SoCalGas technician would be dispatched to the home or business and attempt to troubleshoot the issue. If equipment malfunction occurs during the demonstration, SoCalGas may opt to send the equipment to a lab for root cause analysis, though research, previous demonstration projects, and other jurisdictions currently implementing hydrogen blends indicate this scenario is unlikely.

SoCalGas also plans to conduct leak surveys more frequently than current standard practice for natural gas distribution pipelines to further support the identification of issues if they

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[16] This statement is based on currently available research, appliance certification standards, and SoCalGas's internal assessments. It does not constitute a warranty or guarantee of appliance performance. Actual appliance compatibility may vary depending on age, condition, and manufacturer specifications. SoCalGas will continue to monitor and evaluate appliance performance throughout the demonstration period.

[17] As described in the prepared Direct Testimony of Blaine Waymire on behalf of SoCalGas (SoCalGas's Hydrogen Blending Demonstration – Open System Project) (Chapter 2) at 11, SoCalGas will establish a dedicated means for customer contract specific to the proposed demonstration project.

arise during the test period. In addition, the odorant used to odorize the natural gas system has proven effective for hydrogen-natural gas blends of up to 20% hydrogen, which will aid in the detection of leaks.[18] These measures will help support the timely identification of emerging appliance issues, should they arise.

Does the test protocol call for leaving condition problem [sic] that arise during the test untreated? If so, what effect will that have on safety?

In accordance with OP 7 of D.22-12-057, a final test plan will be developed after approval of the proposed demonstration and coordinated with an independent third party. As outlined above and in A.6, current policies, procedures, customer programs and proposed safety measures intend to safely address appliances that are not operating properly. Appliances found to be unsafe will be red-tagged and disconnected.

6. **Should SoCalGas be required to fix known condition problems with gas appliances in Orange Cove residences and commercial establishments before and/or during the test period? Or should SoCalGas be required to duplicate in a laboratory the condition problems it finds in gas appliances in the project area and test the effect of one to five percent blends on problematic appliances in a separate test facility before launching its project?**

Should SoCalGas be required to fix known condition problems with gas appliances in Orange Cove residences and commercial establishments before and/or during the test period?

SoCalGas should not be required to fix known condition problems with gas appliances in Orange Cove before and during the test period. SoCalGas already has existing policies, procedures, and programs that would more cost-effectively and prudently address such issues, as outlined below. As explained in the Introduction and Section A.5 above, the likelihood and prevalence of such known condition problems is relatively low to justify such measures and additional costs.

[18] R.13-02-008, Hydrogen Blending Compendium Report, Literature Review at 81-82, *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M556/K896/556896659.PDF.

Through existing policies and procedures, SoCalGas Customer Service Field (CSF) employees inspect, adjust, repair, provide parts replacement, and communicate appropriate appliance and equipment referrals. Inspection of appliances and equipment does not include making appliance repairs without charge, other than those commonly referred to as adjustments to enhance safe and efficient use of the gas service. Examples of no-charge adjustments and repairs utilizing expendable parts include, but are not limited to: (1) safety checks, (2) clearing and adjusting orifices and pilots, (3) clearing burner ports and venturis, (4) adjusting air shutters, gas pressure, air pressure, etc., (5) tightening or minor repairs of electrical terminals, (6) carbon monoxide tests, and (7) flue gas analysis. If the appliance repair exceeds the type or amount of repair authorized in SoCalGas policy or procedure, the technician may recommend other services outside of SoCalGas.

In addition, SoCalGas intends to conduct outreach to Orange Cove customers to encourage participation in existing customer assistance and energy efficiency programs prior to and during the demonstration so aging and faulty appliances can be replaced with safe, functional, and more energy efficient ones. Orange Cove is designated as a Disadvantaged Community by CalEPA,[19] and a predominant number of customers may qualify for SoCalGas's Energy Savings Assistance Program, which may be able to subsidize or fully replace existing appliances (along with other program benefits) before implementation. This is a prudent approach that promotes cost-effective measures aimed at reducing the number of appliances with known condition problems.

> Or should SoCalGas be required to duplicate in a laboratory the condition problems it finds in gas appliances in the project area and test the effect of one to five percent blends on problematic appliances in a separate test facility before launching its project?

It would not be prudent nor cost effective to require SoCalGas to duplicate in a laboratory any condition problems found in gas appliances and test the blend in a separate facility before the project begins. Extensive research and lab testing, as noted in Section A.1, along with successful

[19] *See* CalEPA, *Disadvantaged Communities Map*, *available at*: https://calepa.ca.gov/envjustice/ghginvest/.

hydrogen blend implementation by jurisdictions like Hawaii Gas and ATCO, have demonstrated safe and effective appliance performance with hydrogen blends.[20]

Affordability should be a key driver for any additional requirements considered for purposes of these demonstration projects. If before blending commences certain appliances are not working properly, it would not be prudent to separately evaluate those appliances with hydrogen because the appliances are already known to not be in working order. Pre-blending courtesy inspections and targeted deployment of customer assistance programs noted above would be a more prudent approach to address these types of appliances than laboratory testing that would add costs with unknown benefit.

However, if equipment that was initially inspected and found to be in working order malfunctions during the demonstration, SoCalGas will document and track said equipment to better understand the condition. This may involve further laboratory analysis of those appliances to better understand if hydrogen played a role in equipment operation. The proposed project costs reflect the scope as defined in D.22-12.057 and do not include case-by-case laboratory evaluation. A high-level estimate of $250,000 would provide for further root-cause analysis for up to approximately 100 appliances, which SoCalGas believes to be unlikely.

[20] Hawai'i Gas currently blends up to 15% hydrogen in the fuel mix they deliver, *available at*: https://www.hawaiigas.com/sustainability/hydrogen#:~:text=Hawai%CA%BBi%20Gas%20blends%20the%20SNG,highly%20versatile%20energy%20sources%20available. ATCO Gas began delivering a blend of natural gas containing 5% hydrogen to a subsection of the Fort Saskatchewan natural gas distribution system, *available at:* https://gas.atco.com/en-ca/community/projects/fort-saskatchewan-hydrogen-blending-project.html; ATCO Australia blended up to 10% renewable hydrogen into the existing natural gas distribution network as part of the Hydrogen Blending Project in the City of Cockburn, *available at:* https://gas.atco.com/en-au/projects/hydrogen-blending.html.

7. **What effects of the infused hydrogen on the appliances and lives of those Orange Cove residents and commercial operations involved in the project will be tabulated? For example, how will the leakage, if any, of hydrogen from a residential gas appliance be detected and measured by SoCalGas? How can the Commission be assured that all, or substantially all, negative effects of injecting hydrogen into the natural gas SoCalGas supplies to the residences and commercial establishments that are part of the Orange Cove pilot will be recorded?**

What effects of the infused hydrogen on the appliances and lives of those Orange Cove residents and commercial operations involved in the project will be tabulated?

Hydrogen is a naturally occurring element and, as outlined in the Compendium Report, is non-toxic, non-poisonous, and has a health hazard score of zero.[21] Research has demonstrated that carbon monoxide (CO) decreases as hydrogen is blended into the natural gas stream because hydrogen combustion does not produce CO. Research also suggests that nitrogen oxides (NOx) emissions may remain steady or decrease in common appliances.[22] SoCalGas will be measuring combustion emissions (NOx, CO, and carbon dioxide (CO_2)) from end use equipment, supporting evaluation of end use appliances and allowing collection of performance data. As stated in the Introduction, research indicates no compromise to equipment operation at blends of up to 20%.

For example, how will the leakage, if any, of hydrogen from a residential gas appliance be detected and measured by SoCalGas?

As stated in the Introduction, enhanced safety and risk measures will be implemented that include leak surveys of end-use equipment during courtesy home inspections prior to the introduction of hydrogen,[23] and technicians will respond to customer calls if there are inspection requests during the demonstration.[24] Like today, the smell of odorant in natural gas that gives it a

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[21] R.13-02-008, Hydrogen Blending Compendium Report, Chapter Summary at 17, *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M556/K896/556896659.PDF.

[22] *Id*., Literature Review at 61-64.

[23] Prepared Direct Testimony of Blaine Waymire on behalf of SoCalGas (SoCalGas's Hydrogen Blending Demonstration - Open System Project) (Chapter 2), Exhibit 2a.

[24] *Id*. at 16.

"rotten eggs" odor will allow customers to detect potential leakage, as odorant intensities remain intact in blends up to 20% hydrogen blend.[25] If a leak is detected along the pipeline system, SoCalGas does not anticipate an increased risk to health or safety, as the Compendium Report notes that dispersion characteristics for hydrogen blends up to 20% are similar to that of natural gas and can potentially disperse more quickly.[26]

How can the Commission be assured that all, or substantially all, negative effects of injecting hydrogen into the natural gas SoCalGas supplies to the residences and commercial establishments that are part of the Orange Cove pilot will be recorded?

Upon approval from the Commission to proceed, detailed plans for the Orange Cove project can be developed; a comprehensive data collection strategy that considers these plans will be finalized alongside an independent third party.[27] The current proposal includes measuring combustion emissions and performance data, as outlined above. The extent to which SoCalGas can do this within customer homes and businesses will be affected by customer and business-owner access. SoCalGas will develop a comprehensive survey to determine which customers are willing to participate in end-use equipment monitoring and the frequency.[28]

8. How will SoCalGas determine the increased risk of an incident related to the medium pressure system leading to an Asset Failure within the 2,000 residences and 100 commercial establishments proposed to be part of this project as compared to the baseline risk determination referenced in issue No. 1, above? Will SoCalGas do anything to anticipate an increase in risk prior to commencing this pilot project?

How will SoCalGas determine the increased risk of an incident related to the medium pressure system leading to an Asset Failure within the 2,000 residences and 100

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[25] R.13-02-008, Hydrogen Blending Compendium Report, Literature Review at 81-82; *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M556/K896/556896659.PDF.

[26] R.13-02-008, Hydrogen Blending Compendium Report, chapter summary at 8; *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M556/K896/556896659.PDF.

[27] Prepared Direct Testimony of Blaine Waymire on behalf of SoCalGas (SoCalGas's Hydrogen Blending Demonstration - Open System Project) (Chapter 2) at 24.

[28] Prepared Direct Testimony of Blaine Waymire on behalf of SoCalGas (SoCalGas's Hydrogen Blending Demonstration – Open System Project) (Chapter 2) at 13.

commercial establishments proposed to be part of this project as compared to the baseline risk determination referenced in issue No. 1, above?

SoCalGas interprets "within the 2,000 residences and 100 commercial facilities" to mean the end use and plumbing inside customer residences and commercial facilities. See Section A.1 for: (1) SoCalGas's approach for baseline risk evaluation for medium pressure assets via RAMP, and (2) the established safety research and CSA certification standards supporting that anticipated risk at the proposed hydrogen blending levels at Orange Cove is extremely low.

Will SoCalGas do anything to anticipate an increase in risk prior to commencing this pilot project?

SoCalGas does not anticipate an increased risk, as outlined in Section A.1. As explained therein, delivery pressure within commercial facilities is 5 PSI or less downstream of the meter, and in residential facilities is generally at less than 0.5 PSI. This indicates that the partial pressure of hydrogen interacting with the piping inside end users' facilities are lower than that of the medium pressure distribution system (less than 60 PSI). Therefore, the impact on risk or potential for asset failure on the end use pipeline side of the meter would be minimal.

Despite that low risk assessment, there are several measures that SoCalGas proposes to undertake to address safety and risk. Some of those measures were noted in the Introduction. Additionally, SoCalGas intends to develop an in-depth asset failure analysis for the hydrogen production and blending equipment within the demonstration project,[29] hire experienced third party engineering firms to conduct safety studies,[30] and integrate feedback from SoCalGas subject matter and third-party industry experts.[31] Upon approval, SoCalGas will create detailed engineering designs in accordance with existing codes and standards that promote safety such as NFPA 2 and ASME B31.8, and perform these safety studies to identify potential hazards and mitigation measures that can be included in the final design for this project. In addition to these safety and risk assessments, independent third parties will be engaged during the pre-

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[29] Prepared Direct Testimony of Blaine Waymire on behalf of SoCalGas (SoCalGas's Hydrogen Blending Demonstration - Open System Project) (Chapter 2) at 5.

[30] This includes Hazard Identification (HAZID), Quantitative Risk Assessment (QRA), and Hazard and Operability Study (HAZOP).

[31] UCI, *Recommendations for the Proposed "Hydrogen Blending Demonstration Project @ UCI"* (February 14, 2024) at Exhibit H, *available at:* https://uci.edu/hydrogen/uci-h2-project-report.pdf.

commissioning process to review final design and commissioning safety protocols[32] with SoCalGas and city personnel.

9. **What kind of agreement to participate in its pilot project has SoCalGas obtained from the individual residents and owners of commercial establishments in Orange Cove? What written indemnifications, if any, has SoCalGas given to the residents and owners of commercial establishments in Orange Cove who will be part of the pilot project? What explanation of the project and the risks it poses has SoCalGas given its customers and what explanation of the project and its associated risks has or will SoCalGas give the public visiting the residences and commercial facilities of test project participants?**

What kind of agreement to participate in its pilot project has SoCalGas obtained from the individual residents and owners of commercial establishments in Orange Cove?

SoCalGas obtained the approval of the Orange Cove City Council to work with city leaders in implementing the project.[33] SoCalGas has not obtained from individual Orange Cove residents and business owners any written or verbal agreements to participate in the demonstration project. SoCalGas has also engaged extensively with the community through in-person visits to homes and businesses to better understand local concerns and incorporate feedback into the project's design. Because this demonstration project is intended to reflect how hydrogen blending would function across the broader distribution system, it would not be feasible nor cost-effective to exclude individual customers from participation because it would entail isolating every non-participating residence and business to avoid receiving the blended gas. However, SoCalGas has high confidence that blending at levels up to 5% can be done safely in the community.

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[32] Pre-Startup Safety Review (PSSR).

[33] Refer to Resolution No. 2024-04 City of Orange Cove, s*ee* Joint Opposition of SoCalGas, San Diego Gas and Electric (SDG&E), Pacific Gas & Electric (PG&E), and Southwest Gas Corporation (Southwest Gas) to Motion to Dismiss (July 30, 2024), Attachment A: Orange Cove City Council Resolution No. 2024-04, *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M537/K060/537060074.PDF.

What written indemnifications, if any, has SoCalGas given to the residents and owners of commercial establishments in Orange Cove who will be part of the pilot project?

No individual agreements or written indemnifications have been made with residents or commercial establishments.

What explanation of the project and the risks it poses has SoCalGas given its customers and what explanation of the project and its associated risks has or will SoCalGas give the public visiting the residences and commercial facilities of test project participants?

SoCalGas has a positive, long-standing working relationship with the City of Orange Cove and has been working closely with city leaders to implement stakeholder engagement activities to share information with customers and stakeholders about the proposed demonstration, the robust safety measures to be put in place, and to answer community questions.[34] SoCalGas has been proactive in its engagement throughout the Orange Cove community. Below is a list of activities that SoCalGas has taken to engage stakeholders and listen to feedback:

- Hosted community meetings in English and Spanish.
- Shared information about the project, answered questions, gathered feedback.
- Distributed project fact sheets and brochures.
- Conducted direct community touchpoints / door-to-door outreach (bilingual) in conjunction with a local community-based organization.
- Left door hangers at residences and businesses.
- Posted updates and info on dedicated project webpage: socalgas.com/orangecove in English and Spanish.
- Maintained presence at community events and gathering locations, including the annual Independence Day Celebration and holiday toy and food giveaways.
- Provided briefings for community leaders/elected officials, community groups, educational institutions, business organizations, non-profits.

[34] *See, e.g.*, *id*. (Orange Cove City Council Resolution No. 2024-04 noting that the "City Council of the City of Orange Cove supports SoCalGas' efforts to construct such project and will work in conjunction with SoCalGas to ensure the project is completed…The City Manager is authorized to sign Contract documents related to this project on behalf of the City of Orange Cove, and the City Clerk is authorized to attest to the signature of the individual who signs on behalf of the City of Orange Cove.").

- Targeted social media posts in English and Spanish.
- Pitched news articles in local media.
- Hosted Orange Cove and Fresno County officials to visit SoCalGas's [H2] Innovation Experience. This is a home that shows how clean renewable hydrogen can be produced, blended, and used safely with existing appliances. Officials were able to tour the home and receive a briefing from SoCalGas. They learned that this is an established technology that takes place in other parts of the country as well; the home shows that this can be done safely.

City of Orange Cove leaders have indicated the city is willing to continue working with SoCalGas to implement additional stakeholder engagement activities.

As part of its community engagement, SoCalGas frequently addresses questions surrounding safety and risk, including discussing plans for emergency protocols and safety mitigation measures during community touchpoints. SoCalGas will develop specific safety protocols for the Orange Cove community.[35] These safety protocols will be shared with each customer in the community when finalized.

10. What is the failure rate of electrolyzers of the size and type SoCalGas intends to use in this project? What steps will SoCal take if the electrolyzer(s) used in this project break down? Would the failure of one or more electrolyzers during the pilot project corrupt the data SoCal intends to collect? How would SoCalGas obtain a replacement source of hydrogen if the electrolyzer(s) initially installed for the pilot project fail(s)? Will there be noticeably different safety effects of using "clean renewable hydrogen" as compared to any other type of hydrogen in this pilot project?

While industry has documented failure scenarios for different types of electrolyzers , the rate at which electrolyzers fail is not as widely documented. Regarding the electrolyzer specific to the proposed project, SoCalGas has not selected an electrolyzer type or manufacturer and will not do so until the engineering design phase, once the application has been approved by the

[35] Prepared Direct Testimony of Blaine Waymire on behalf of SoCalGas (SoCalGas's Hydrogen Blending Demonstration - Open System Project) (Chapter 2) at 16.

CPUC. SoCalGas has a dedicated supply management process that helps vet and contract with reputable manufacturers; successful history with hydrogen generation products will be considered. SoCalGas will seek to include maintenance support from the manufacturer during contracting and collaborate to develop strong maintenance and operation plans.

Upon approval by the Commission, an engineering design plan would be developed that would consider alternative options for equipment and timing of replacement alternatives to allow for continued collection of adequate data. SoCalGas also intends to store multiple days of hydrogen needs onsite so that in the event of an electrolyzer shutdown, hydrogen will continue to be available to blend at the project location until the electrolyzer is brought back online. "Clean renewable hydrogen" is – at a molecular level – no different than hydrogen produced via other methods and therefore presents no difference in safety for this demonstration project.

11. What is the current projected cost of the Orange Cove pilot project in light of the delays in this proceeding and the list of issues in this scoping memo?

As of the date of the Amended Application filed on March 1, 2024, the initial unloaded cost estimate, for the Orange Cove Demonstration project is $48.4 Million,[36] based on a Class 5 estimate, with a corresponding revenue requirement of $53.6 million.[37] In light of delays in the proceeding and the issues outlined in the Scoping Memo, SoCalGas has developed a high-level assessment of potential cost impacts, estimating a potential incremental direct increase of approximately $3-$6 million. This preliminary range reflects cost pressures associated with the delay and issues in the Scoping Memo, and includes:

- Escalation increase of approximately 5% for 2026 start.
- Market adjustments to land lease rates.
- Increased equipment inspection and outreach.
- These estimates are scenario based: lower bound assumes no import tariffs, upper bound assumes 25% tariffs on key components such as solar panels, electrolyzers, battery storage systems, and blending skids.

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[36] *Id.* at 27.

[37] Prepared Direct Testimony of Nasim Ahmed and Marjorie Schmidt-Pines on behalf of SoCalGas (Chapter 6) at 4.

Furthermore, SoCalGas is considering additional lab evaluation for root cause analysis in the event of equipment malfunction, as outlined in Section A.6. A high-level cost estimate, assuming internal labor, places this activity at approximately $250,000.

These figures represent preliminary estimates. SoCalGas remains committed to transparency and cost discipline; further delays may result in additional incremental costs.

12. Is the Orange Cove project reasonably likely to provide new information on the ability of the California gas infrastructure [sic] safely and cost-effectively store and deliver hydrogen gas blended with natural gas to one or more customer classes? Are there any less costly ways of obtaining the same information?

Is the Orange Cove project reasonably likely to provide new information on the ability of the California gas infrastructure safely and cost-effectively to store and deliver hydrogen gas blended with natural gas to one or more customer classes?

Yes, the Orange Cove project[38] is expected to provide valuable new insights into the safe and cost-effective delivery of hydrogen blended with natural gas through California's existing gas infrastructure. As the first community-scale hydrogen blending demonstration in the State, it will validate and demonstrate the compatibility of hydrogen blends within SoCalGas's distribution system under real-world conditions.[39] The project will generate operational experience related to system performance, maintenance, and emergency response protocols. Additionally, it will offer important lessons on customer engagement, integration of community feedback, public education and acceptance.

While certain aspects of hydrogen-natural gas blending could be studied through laboratory evaluation, modeling, or smaller-scale demonstrations at potentially lower cost, these approaches limit results: They reduce the level of insight, particularly regarding operational data

[38] Proposed project equipment includes an aboveground hydrogen storage tank where hydrogen is stored before it is blended with natural gas.

[39] CPUC, *Hydrogen Blending Impacts Study* (July 18, 2022) at 5, *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M493/K760/493760600.PDF; *see also* R.13-02-008, Hydrogen Blending Compendium Report, Literature Review at 3, *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M556/K896/556896659.PDF.

(such as compression needs, etc.), infrastructure compatibility, operational procedure enhancements (such as emergency response), and public acceptance.[40]

Are there any less costly ways of obtaining the same information?

There are few viable "less costly ways" of obtaining this same information because the Orange Cove site has unique characteristics and operation in the SoCalGas distribution system, as described in Section A.3. "Clean renewable hydrogen" production proposed for the project, supported by community stakeholders, relies on a solar array and battery system that comprises 55% ($26.5M) of the total proposed project costs. Eliminating this component would significantly reduce costs, but forgo clean renewable hydrogen generation. The array to be used in Orange Cove has already been proposed to be donated post-completion, reducing decommissioning costs and benefiting the community.

See also Section A.3 as to why performing the demonstration on a smaller section of the Orange Cove community would reduce the amount of useful data, be inconsistent with D.22-12-057, and likely increase costs.

13. What changes in the operation of their gas appliances might customers (both residential and commercial) experience once hydrogen is injected into the natural gas delivered to them? Will they experience an increase or decrease in heating efficiency?

What changes in the operation of their gas appliances might customers (both residential and commercial) experience once hydrogen is injected into the natural gas delivered to them?

There are no expected changes. Residential appliances have been shown to operate safely and effectively with hydrogen blends at or above a 5% level, without significant impacts on safety, performance, or heating efficiency.[41] Similarly, commercial appliances – including boilers, cooking equipment, and water heaters – have demonstrated safe and reliable operation

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[40] Prepared Direct Testimony of Blaine Waymire on behalf of SoCalGas (SoCalGas's Hydrogen Blending Demonstration - Open System Project) (Chapter 2) at 17.

[41] CPUC, *Hydrogen Blending Impacts Study* (July 18, 2022) at 8; *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M493/K760/493760600.PDF; *see also* R.13-02-008, Hydrogen Blending Compendium Report, Chapter Summary at 14; *available at* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M556/K896/556896659.PDF.

with 5% hydrogen blends.[42] However, due to variability in equipment age, design and operating conditions, further evaluation may be warranted to confirm compatibility under various usage scenarios.

Will they experience an increase or decrease in heating efficiency?

SoCalGas anticipates that Orange Cove customers – both residential and commercial – will experience consistent operation of gas appliances and/or heating efficiency. Expected changes in efficiency are minimal (generally less than 2%) and fall within normal measurement error margins. From a billing standpoint, SoCalGas will apply volumetric adjustments based on the blended gas's calorific value to maintain accurate, energy-equivalent charges to customers.

The Wobbe index[43] of a 5% hydrogen blend (1,347) closely aligns with that of standard natural gas (1,304), supporting interchangeability and consistent appliance performance. Nevertheless, generalizing efficiency impacts across all commercial equipment is limited due to the diversity of technologies in use. This demonstration project would help generate more information about heating efficiency, Wobbe index, and appliance performance with a blend of up to 5%.

14. How many Orange Cove customers does SoCalGas expect will give permission for SoCalGas to enter their premises and inspect gas appliances before, during and after the pilot project?

As mentioned in Section A.5, it is challenging to estimate how many customers will allow SoCalGas to enter their premises to inspect gas appliances. However, the proposed project has received consistent support from residents, local leaders, and elected officials. To maintain transparency, SoCalGas has conducted direct community touchpoints / door-to-door home visits in English and Spanish, engaged residents and businesses in Orange Cove to share information

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[42] Air-Conditioning, Heating, & Refrigeration Institute (AHRI), *Assessment of Hydrogen Enriched Natural Gas (Report No. 8024)* (January 2021), *available at:* https://www.ahrinet.org/system/files/2023-08/AHRI-8024_Final%20Report.pdf; *see also*, R.13-02-008, Hydrogen Blending Compendium Report, *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M556/K896/556896659.PDF.

[43] The Wobbe Index (WI) is the main indicator of the interchangeability of fuel gases such as natural gas LPG and Town Gas and is frequently defined in the specifications of gas supply and transport utilities. *See* ChemEurope, *Wobbe Index, available at:* https://www.chemeurope.com/en/encyclopedia/Wobbe_index.html.

about courtesy appliance inspections, safety measures and provide an overview of the project. Because of these efforts, SoCalGas expects a significant number of customers will permit SoCalGas to enter their premises.

15. **How can the Commission be assured that every individual gas appliance in a residence or commercial establishment in Orange Cove is safe to include in SoCal's Orange Cove project? Can and will all appliances not deemed safe to include in the project be brought up to a condition of safety or replaced with a safe alternative before any hydrogen is introduced into the project area? If so, can that be accomplished within the currently proposed budget for the project?**

How can the Commission be assured that every individual gas appliance in a residence or commercial establishment in Orange Cove is safe to include in SoCal's Orange Cove project?

See Introduction and Section A.5 above which outlines various research as well as safety, outreach, and inspection measures to be taken.

Can and will all appliances not deemed safe to include in the project be brought up to a condition of safety or replaced with a safe alternative before any hydrogen is introduced into the project area?

See Section A.6 above which discusses SoCalGas's response to appliances condition problems.

If so, can that be accomplished within the currently proposed budget for the project?

SoCalGas is currently not requesting funds to bring up to a safe condition all appliances not deemed safe or replaced with a safe alternative before hydrogen is introduced. As outlined in Section A.6, SoCalGas will coordinate awareness and availability of existing programs help mitigate the number of potentially "unsafe," damaged, or aging equipment present in the community.

16. If a substantial number of residents of Orange Cove refuse to allow SoCalGas to enter their residences to conduct examinations / repairs of their gas appliances, what alternatives exist to provide a statistically reliable comparison to the statewide gas infrastructure?

To the extent that the term "statewide gas infrastructure" is intended to include end-use equipment, there is no good alternative to inspecting appliances involved in this demonstration other than inspecting the appliances used in the demonstration. SoCalGas is open to suggestions from parties and the Commission on this issue. However, based on SoCalGas's extensive community engagement activities outlined in Section A.9, the Company is optimistic that it can work with residents, city officials, and community leaders to conduct enough voluntary inspections to gather relevant end use information. SoCalGas is offering courtesy inspections of customers' equipment for two primary reasons: (1) to promote safe operations of end use equipment prior to (and regardless of) the hydrogen blending demonstration period; and (2) to gather information on the specific equipment customers have in Orange Cove. SoCalGas is offering courtesy inspections of customers' equipment for two primary reasons: (1) to promote safe operations of end-use equipment prior to (and regardless of) the hydrogen blending demonstration period; and (2) to gather information on the specific equipment customers have in Orange Cove.

To the extent that the term "statewide gas infrastructure" is intended to mean utility-owned infrastructure,[44] SoCalGas's inspections and/or no-charge repair of end use equipment will not provide information on "statewide gas infrastructure" because the data collected upstream of the customer meter is intended to inform operations of the statewide gas infrastructure. Therefore, Orange Cove residents prohibiting SoCalGas inspection and/or repair of appliances would not affect information gathered on the statewide gas infrastructure.

[44] Such as pipelines, valves, and assets upstream of the customer meter.

17. Should emergency precautions beyond the normal, be made to protect people in the City of Orange Cove in the event an accident occurs as a result of the hydrogen blending pilot? If so, what are they? Have they been incorporated into the budget for this SoCal project?

Yes, SoCalGas is implementing emergency precautions beyond standard practice for the hydrogen blending demonstration in Orange Cove. These measures are designed to enhance safety and have been incorporated into the project cost. (SoCalGas interprets "emergency precautions" to mean planning required by industry codes, standards and best practices.) SoCalGas will follow industry codes and standards and is proposing to enhance safety measures beyond what is required. These include the implementation of the following safety protocols for the hydrogen production and blending facility[45]:

- Safety assessment for hydrogen storage and hydrogen components;
- Creation of hydrogen blending specific customer protocols and emergency response plans;
- Continuous remote monitoring of hydrogen production, storage, and blending sites; and
- Automatic and remote shutdown capabilities for the hydrogen production and blending facility in the case an alarm is triggered or a leak is detected.

SoCalGas is also implementing additional safety measures for homes and businesses receiving the blended gas, as outlined in the Introduction and Section A.5. Specific customer protocols and emergency response plans will be created for the demonstration project with independent third parties (as outlined in Section A.8) and local fire authorities.

Activities listed above have been incorporated into the existing project budget. SoCalGas may identify additional activities during the detailed engineering design phases and is open to additional safety enhancements received through stakeholder engagement.

[45] Prepared Direct Testimony of Blaine Waymire on behalf of SoCalGas (SoCalGas's Hydrogen Blending Demonstration - Open System Project) (Chapter 2) at 16-17.

18. Are there any anticipated billing effects on the average SoCalGas residential and average industrial customers (as compared to all SoCalGas customers) if the proposed Orange Cove pilot project is approved by the Commission?

There are two distinct ways billing could be affected:

(1) Through cost recovery for the project, which will be distributed across customers as outlined in Chapter 6 testimony;[46] and

(2) Through potential bill changes due to gas usage from the hydrogen blend itself, which can be corrected with appropriate billing factors.

While the first will result in a modest impact to customer bills as detailed below, the second will not—customers in Orange Cove will continue to be billed accurately for their gas usage, as billing systems will account for the calorific value of the blended gas.

First, billing effects for average SoCalGas residential and average commercial/industrial customers are contingent upon estimated project costs and for both projects, the 2025 average monthly bill of 36 therms/month is expected to increase by $0.20 per month, or 0.29%, increasing from $68.40 to $68.60.[47] Industrial customer usage has higher variability and may therefore see a broader range of effects depending on degree of usage than residential with regard to monthly impact. For the Orange Cove project only, the average monthly bill impact for a Residential Non-Care customer is expected to increase by $0.13 per month or 0.19%.

Second, billing effects for Orange Cove customers due to receipt of blended gas are not anticipated, as outlined in Section A.13. and indicated in Chapter 2 testimony.[48]

19. What funding sources other than ratepayers are there for constructing and operating this project during its proposed lifetime?

As noted in the Amended Application, SoCalGas made reasonable attempts to use existing Commission-authorized funding and other funds, including the California Energy

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[46] Prepared Direct Testimony of Nasim Ahmed and Marjorie Schmidt-Pines on behalf of SoCalGas (Chapter 6) at 5.

[47] *Id*.

[48] Prepared Direct Testimony of Blaine Waymire on behalf of SoCalGas (SoCalGas's Hydrogen Blending Demonstration - Open System Project) (Chapter 2) at 14.

Commission's (CEC) R&D Program and federal funding, to the extent possible.[49] SoCalGas is not aware of other Commission-authorized funding for hydrogen blending pilot projects and has not found eligible pathways through the CEC R&D Program.[50] SoCalGas is also unaware of any federal funding opportunities for live blending pilot projects in natural gas pipelines. SoCalGas has not identified any additional funding sources since the filing of the Amended Application and remains open to any alternative funding sources should they be made available.

Nonetheless, as indicated in the Amended Application,[51] it would be appropriate for ratepayers to fund the Orange Cove project because of the potential broad benefits for all ratepayers. This project would demonstrate live hydrogen blending to help inform a statewide hydrogen injection standard that would support California's decarbonization goals; this can be accomplished in a manner that leverages the affordability of and existing ratepayer investments in our gas system.

E. UC Irvine Distribution Project (SoCalGas)

1. What is the existing baseline risk of an incident related to the medium pressure system that leads to Asset Failure within the university's student center complex proposed to be part of this project? How was, or will, this baseline risk be established?

For multiple reasons, a baseline risk assessment of end use equipment and plumbing was not performed nor proposed as part of the demonstration project. This is because the anticipated risk at the proposed hydrogen blending levels is extremely low, and the existing data supports that conclusion. SoCalGas interprets "within the university's student center complex" to mean the end use equipment and plumbing within UCI's Anteater Recreation Center (ARC). The UCI demonstration project is planned for hydrogen blending between 5-20%. which falls within the thresholds support by safety research noted in the Introduction and Section A.1. Given these established safety findings, SoCalGas did not perform a baseline risk assessment for the reasons outlined in Section A.1.

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[49] Joint Amended Application of SoCalGas, SDG&E, PG&E, and Southwest Gas to Establish Hydrogen Blending Demonstration Projects (March 1, 2024) at 22.

[50] *Id*.

[51] Amended Application at 8-11.

SoCalGas is committed to working with its customers, end users, and vendors, and ahead of the demonstration project will work with UCI to inspect all equipment to receive the blended gas. As outlined in the Introduction, SoCalGas has proposed various means of evaluating UCI's ARC for potential safety hazards prior to the introduction of hydrogen to the system and throughout the proposed demonstration.

2. What is the baseline risk of a [sic] incident related to the medium pressure system that leads to Asset Failure within this pilot project's physical area? How was, or will, this baseline risk be established?

As described in Section A.1, SoCalGas evaluates baseline risk for asset failure of its medium pressure system as outlined in the RAMP report with an established threshold of annual probability greater than 6 x 10-6 of a serious incident.[52] SoCalGas interprets the "project's physical area" to mean SoCalGas's medium pressure distribution pipelines, hydrogen production and blending, which are part of the proposed demonstration project – "upstream" of the customer meter. As outlined in Sections A.1 and E.1, the UCI demonstration project is planned for hydrogen blending between 5-20%. which falls within the thresholds supported by safety research. Please see Section A.8 regarding risk analyses pertaining specifically to the hydrogen production and blending equipment which will be completed for both the Orange Cove and UCI demonstration projects.

In addition, UCI's provost formed a committee of independent professors in the field of Material Science, Civil and Environmental Engineering, and Chemistry to review and vet SoCalGas's proposed project.[53] The recommendation from this committee was to ultimately move forward with the project, and that UCI staff create an administrative team to oversee the engineering design and build out of the demonstration project.[54] The professional opinion from these professors is that the proposed demonstration project could be executed safely in the ARC.[55]

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[52] *See* 2025 Risk Assessment Mitigation Phase (RAMP) Report, available at https://www.socalgas.com/sites/default/files/2025-05/SCG-RAMP-REPORT-final.pdf

[53] UCI, *Recommendations for the Proposed "Hydrogen Blending Demonstration Project @ UCI"* (February 14, 2024), *available at:* https://uci.edu/hydrogen/uci-h2-project-report.pdf.

[54] *Id*.

[55] *Id*.

3. **Are the polyethylene pipes delivering the blended gas from the blender in the parking lot to the buildings in the project representative of a meaningful portion of the distribution portion of the statewide gas infrastructure? Is used, instead of new, polyethylene pipe a better representative of the statewide system for this project?**

The existing polyethylene (PE) pipes involved in the proposed project are representative of a meaningful portion of the statewide gas infrastructure. These pipes were installed in 1999 and 2003, and no new PE assets are expected to be installed within the demonstration project. These pipes are classified as "modern PE materials," having been installed in 1999 or later. These materials are representative of the State-of-the-Art (SOTA) PE pipes that make up approximately 40% of SoCalGas's distribution system. Therefore, the project provides a meaningful opportunity to evaluate hydrogen compatibility with the relevant type of PE infrastructure that exists in SoCalGas's current gas distribution network. Performing the demonstration on existing PE rather than new PE pipe offers a more informative basis for this project in a more cost-effective manner.

SoCalGas also plans to install new steel pipe material at the outlet of the blending skid, rather than PE pipe to create a mixed material pipeline project operating at distribution pressures, to complement the other projects proposed in A.22-12-057. For purposes of this project, SoCalGas will tie in the new steel line at the outlet of the blending skid into existing PE pipeline.

4. **What effects of the blended hydrogen on the appliances and lives of those working or living in the buildings involved in the project will be tabulated? For example, how will the leakage, if any, of hydrogen from a gas appliance be detected and measured by SoCalGas? What assurance is there that all, or substantially all, negative effects of blending hydrogen into the natural gas SoCalGas supplies to the buildings that are part of its UC Irvine pilot have been accounted for?**

<u>What effects of the blended hydrogen on the appliances and lives of those working or living in the buildings involved in the project will be tabulated?</u>

See Section A.7. In addition, while the majority of equipment in the ARC is isolated from occupants and located in equipment rooms or outside, SoCalGas plans to measure for

combustion emissions on a monthly basis.[56]

For example, how will the leakage, if any, of hydrogen from a gas appliance be detected and measured by SoCalGas?

SoCalGas will conduct leak surveys and data will be collected in accordance with the project's test plan to report appliance performance.[57] SoCalGas will also review the current operating procedures for these appliances and update them, if necessary.

With respect to appliance conditions, SoCalGas will perform inspections (leak and performance) of end use equipment at the ARC prior to the demonstration and document performance and emissions monthly. Leak survey will be performed from meter to end use equipment on a monthly basis,[58] and gas detection sensors will be installed where equipment is housed inside in the ARC.[59] Outdoors, the hydrogen production and blending equipment will have automatic and remote shut down capabilities should a leak be detected.[60] As stated in Section A.7, odorant is still effective with hydrogen blends of 5-20%, which is a key indicator for occupants to identify if a leak is present.

What assurance is there that all, or substantially all, negative effects of blending hydrogen into the natural gas SoCalGas supplies to the buildings that are part of its UC Irvine pilot have been accounted for?

SoCalGas has proposed various measures that align with or exceed existing safety protocols for natural gas, as outlined in the Introduction and Section E.5. Upon approval from the Commission to proceed, detailed plans for the UCI project can be developed; a comprehensive data collection strategy that considers these plans will be finalized alongside an independent third party.[61]

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[56] Corrected Revised Prepared Direct Testimony of Blaine Waymire on behalf of SoCalGas (SoCalGas's Hydrogen Blending Demonstration – Closed System Project) (Chapter 1R), Exhibit 1A.

[57] *Id.*

[58] *Id.*

[59] *Id*. at 16.

[60] *Id.*

[61] Prepared Direct Testimony of Blaine Waymire on behalf of SoCalGas (SoCalGas's Hydrogen Blending Demonstration - Open System Project) (Chapter 2) at 24.

5. **How will SoCalGas determine the increased risk of an incident related to the medium pressure system that leads to Asset Failure within university's gymnasium and reaction complex proposed to be part of this project as compared to the baseline risk determination referenced in Issue No.1, above? Will SoCalGas do anything to anticipate an increase in risk prior to commencing the pilot project?**

SoCalGas has not proposed a comparative risk assessment specific to the end use equipment and internal piping within the UCI ARC, consistent with the approach outlined in Sections A.1 and E.1. The scope of the project, as defined in D.22-12-057, does not require a baseline or comparative risk assessment of end-use equipment, and the associated costs were developed accordingly. Given the limited duration of the 18-month demonstration and the extensive body of research—including the Compendium Report—supporting the safe operation of end-use equipment with hydrogen blends up to 20%, additional comparative risk analysis at the end-use level is not expected to yield materially different insights.

SoCalGas is also proposing various safety and risk mitigation measures for operation and design. These safety and risk mitigation measures include those listed in the Introduction and Section A.8 as well as the following:

- Asset Failure analysis for the hydrogen production and blending facility, situated adjacent to the ARC facility;
- Independent third-party safety reviews (HAZID, QRA, HAZOP) and Pre-Startup Safety Review (PSSR);
- Coordination with UCI and local fire authorities to develop site-specific emergency protocols; and
- Compliance with existing Codes and Standards intended to promote safety, such as NFPA 2 and ASME B31.8 to guide project design.

6. **How will SoCalGas determine the increased risk of an incident related to the medium pressure system leading to Asset Failure within this pilot project's physical area as compared to the baseline risk determination referenced in Issue No.2, above? Will SoCalGas do anything to anticipate an increase in risk prior to commencing the pilot project?**

SoCalGas has not proposed a comparative risk assessment specific to the medium pressure system in the UCI Demonstration project area, consistent with the approach outlined in Section E.2.

Research confirms that natural gas blended with hydrogen up to 20% poses low risk to the natural gas distribution system when operating in the medium pressure range (<60PSI),[62] as planned in UCI demonstration. As outlined in Sections A.1 and E.2, SoCalGas has an overarching analysis of baseline risk of incident or asset failure for its medium pressure distribution system through its RAMP report for operations with natural gas. SoCalGas has not developed a different framework for this same baseline risk analysis with hydrogen blends.

The medium pressure system within the pilot project area operates under very low stress conditions[63] with minimal cycling,[64] thereby supporting the determination that hydrogen blends of up to 20% fall within a risk range comparable to that of conventional natural gas service. Please also refer to Section E.5.

Nonetheless, SoCalGas proposes several safety and risk mitigation measures on the medium pressure pipeline system for the purposes of the demonstration project, as outlined in the Introduction, which include, but are not limited to: enhanced leak detection protocols on the pipeline and meters, occurring before, during, and after the demonstration project; and design measures to prevent hydrogen or hydrogen blends from reaching natural gas storage areas and electrical switching equipment.

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62 R.13-02-008, Hydrogen Blending Compendium Report, Chapter Summary at 3-5, *available at:* https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M556/K896/556896659.PDF.

63 Medium pressure system assets, existing and new, are in compliance with the Department of Transportation requirements and operate at less than 20% Specified Minimum Yield Strength (SMYS); the Maximum Operating Pressure of the system serving the project area is 45PSI and less than the Maximum Allowable Limit by CFR 192 Code of 100 PSI.

64 R.13-02-008, Hydrogen Blending Compendium Report, Chapter Summary at 3-5, *available at:*https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M556/K896/556896659.PDF.

III. CONCLUSION

SoCalGas appreciates this opportunity to provide these responses to Appendix B of the Scoping Memo and looks forward to working closely with the Commission and parties in evaluating the proposed demonstration projects.

Respectfully submitted,

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