Application: A.25-06-XXX
Exhibit No.:
Witness: Katrina Regan

PREPARED DIRECT TESTIMONY OF
KATRINA REGAN
ON BEHALF OF
SOUTHERN CALIFORNIA GAS COMPANY

(CHAPTER 5 – ANGELES LINK ENGINEERING & DESIGN)

BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF CALIFORNIA

June 12, 2025

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PREPARED DIRECT TESTIMONY OF
KATRINA REGAN
(ENGINEERING & DESIGN)

I. PURPOSE AND OVERVIEW OF TESTIMONY

The purpose of my direct testimony on behalf of Southern California Gas Company (SoCalGas) is to demonstrate the prudent and reasonable execution of SoCalGas's Angeles Link Phase 1 (Phase 1) engineering and design studies (collectively, Engineering & Design Studies). In Application (A.) 22-02-007, SoCalGas requested authorization to track costs associated with Angeles Link Phase 1, including conducting feasibility studies to develop a first-of-its-kind hydrogen pipeline transport system to deliver clean renewable hydrogen into the Los Angeles Basin.[1] On December 15, 2022, the California Public Utilities Commission (Commission) issued Decision (D.) 22-12-055 (Phase 1 Decision), approving establishment of the Angeles Link Memorandum Account (ALMA) and authorizing SoCalGas to record costs associated with Phase 1 activities.[2] In authorizing the ALMA, the Commission concluded that "the public interest is served if SoCalGas studies whether Angeles Link is feasible, cost-effective, and viable"[3] and that "it serves the public interest for SoCalGas to perform feasibility studies of the Project immediately."[4]

In Phase 1, SoCalGas conducted over a dozen studies and produced an Environmental and Social Justice Community Engagement Plan (ESJ Plan)[5] and a Framework for Affordability Considerations (Affordability Framework) (collectively, the Phase 1 Studies).[6] The Phase 1 Studies examined Angeles Link's viability, feasibility, cost effectiveness, and potential public

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1 *See* A.22-02-007, Application of Southern California Gas Company for Authority to Establish a Memorandum Account for the Angeles Link Project (February 17, 2022), *available at*: https://www.socalgas.com/sites/default/files/A22-02-SOCALGAS-Angeles_Link_Memorandum_Account_Application.pdf.

2 Phase 1 Decision at 73 (Ordering Paragraph (OP) 1).

3 *Id.* at 68 (Conclusion of Law (COL) 4).

4 *Id.* at 16, 61-62 (Findings of Fact (FOF) 1, 3, 6, 7).

5 *See* Chapter 2 (Direct Testimony of Frank Lopez) for further details regarding the ESJ Plan.

6 *See* Chapter 1 (Direct Testimony of Shirley Arazi and Amy Kitson) for additional details.

interest benefits to ratepayers and the broader community.[7] These activities were planned and executed in a manner that considered affordability, integrated robust stakeholder engagement, and complied with the Phase 1 Decision.

My testimony describes the activities associated with the Engineering & Design Studies conducted during Phase 1, which collectively amount to $3.7 million in operating and maintenance (O&M) expenditures and support the $24.3 million recorded to the ALMA[8]. The Engineering & Design Studies include the following:

- Evaluation of Applicable Safety Requirements (Safety Study)
- Workforce Planning & Training Evaluation (Workforce Study)
- Pipeline Sizing & Design Criteria (Design Study)
- Preliminary Routing/Configuration Analysis[9] (Routing Analysis)

My testimony provides the description and cost components for each of the Engineering & Design Studies, explains how the Engineering & Design Studies were executed in compliance with the Phase 1 Decision;[10] and demonstrates how the studies were prudently managed to control cost and achieve the deliverables outlined in the Phase 1 Decision while engaging with key stakeholders throughout the process.

As demonstrated in my testimony and workpapers, these costs were prudently and reasonably incurred, and the associated revenue requirement is justified for rate recovery. To

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[7] In compliance with the Phase 1 Decision, SoCalGas made reports of the results and data of the Phase 1 Studies available to the public at: https://www.socalgas.com/regulatory/angeleslink

[8] Expenditures for these activities were incurred from January 2023 through December 2024, with some discrete trailing charges in 2025. *See* Chapter 6 (Direct Testimony of Jenny Chhuor and Michael W. Foster) for details on the ALMA balance and associated revenue requirement requested for rate recovery in this Application.

[9] Components of this activity were originally referenced as the "Right-of-Way Study" and the "Franchise Study." *See* Q1 2024 Angeles Link Phase 1 Quarterly Report at 17 for additional details. The quarterly reports provided status updates on the feasibility studies during Phase 1, identified and responded to stakeholder feedback received, and attached transcripts of PAG and CBOSG meetings and materials presented at these meetings held during that quarter. The quarterly reports were submitted to the Commission and are published on SoCalGas's website, *available at:* https://www.socalgas.com/regulatory/angeleslink.

[10] Phase 1 Decision at 73-75 (OP 3(a), 3(e), 3(h), 5). The studies were scoped and conducted in compliance with the Phase 1 Decision in its entirety, which includes broader requirements than those required for cost recovery, including OP 6 (*id.* at 75-77). Phase 1 Decision OP 6 requirements to advance to Phase 2 are being addressed in A.24-12-011.

facilitate the review process and for ease of reference, additional information regarding the Engineering & Design Studies is included in my supporting workpapers. The information in this chapter provides a summary of the activities and associated costs.

II. COST COMPONENTS FOR ENGINEERING & DESIGN STUDIES

Table 1 below provides a summary of the fully loaded O&M costs incurred to prepare the Phase 1 Engineering & Design studies, totaling approximately $3.7 million. A combination of internal and external resources were utilized to effectively complete these activities. Direct costs reflect labor and non-labor costs. Labor costs include SoCalGas personnel who implemented Phase 1 activities, and non-labor costs include third-party contractor costs supporting the development of the studies as well as other miscellaneous supporting costs.[11] Indirect costs reflect costs for overhead loaders.[12] As described in Chapter 6 (Direct Testimony of Jenny Chhuor and Michael W. Foster), the total ALMA balance of $24.3 million is the basis for the requested revenue requirement for cost recovery.

Table 1: Chapter 5 Total Costs (in millions)

Engineering & Design Studies				
Study	**Labor**	**Non-Labor**	**Overheads**	**Total Loaded Costs**
Safety Study	$0.2	$0.2	$0.2	$0.6
Workforce Study	$0.2	$0.3	$0.2	$0.7
Design Study	$0.2	$0.5	$0.2	$0.9
Routing Analysis	$0.3	$1.0	$0.2	$1.5
Total Costs	**$0.9**	**$2.0**	**$0.8**	**$3.7**

III. COMPLIANCE WITH PHASE 1 DECISION AND DESCRIPTION OF ENGINEERING & DESIGN STUDIES

In the Phase 1 Decision, the Commission provided that SoCalGas may seek recovery of Phase 1 costs if it satisfies conditions set forth in OP 3 and demonstrates how the recorded costs and activities meet the project-specific standards identified in OP 5. The Engineering & Design

[11] *See* Chapter 1 (Direct Testimony of Shirley Arazi and Amy Kitson) for additional details.

[12] *See* Chapter 6 (Direct Testimony of Jenny Chhuor and Michael W. Foster) for additional details on the ALMA balance.

Studies demonstrate compliance with the following planning process requirements in OP 3 and OP 5:

- 3(a): Feasibility studies for the Angeles Link Project to the service of clean renewable hydrogen that is produced with a carbon intensity equal to or less than four kilograms of carbon dioxide-equivalent produced on a lifecycle basis per kilogram and does not use any fossil fuel in its production process.
- 3(d): Prior to receiving authority to record any Phase Two costs, SoCalGas shall join other entities that are members of the Alliance for Renewable Clean Hydrogen Energy Systems in support of the State of California's application for the federal funding provided through the Infrastructure Investment and Jobs Act.
- 3(e): SoCalGas shall conduct quarterly stakeholder engagement meetings, including quarterly meetings with Planning Advisory Group members. SoCalGas shall also identify and invite participation from community-based organizations that may potentially be impacted by the Project, including disadvantaged communities and environmental social justice groups, in either the quarterly Planning Advisory Group meetings or some other stakeholder engagement process.
- 3(h): SoCalGas shall submit to the Commission's Deputy Executive Director for Energy and Climate Policy quarterly reports to provide an update on the Angeles Link Project and the feasibility studies, and to report on any preliminary results and findings. The reports shall not include any redacted data or finding unless SoCalGas is granted confidentiality of the data in accordance with General Order 66-D. The reports shall be made available to the public. SoCalGas shall solicit feedback from parties and the Planning Advisory Group members and include this feedback in the reports. SoCalGas shall serve these reports on the service list of this proceeding.
- 5(a): How did the planning process address affordability concerns in the development of the Project?
- 5(b): How did the planning process consider the impacts to disadvantaged communities and address environmental justice concerns in the development of the Project?

- 5(c): How did the planning process consider California environmental law and public policies in the development of the Project?
- 5(d): How did the planning process gather and address stakeholder concerns?
- 5(e): How did the planning process consider and evaluate Project alternatives, including a localized hydrogen hub or other decarbonization options such as electrification, their costs and their environmental impacts?

The description of each study and how it complies with the Phase 1 Decision are provided below in Section III.A. through III.D.

A. Evaluation of Applicable Safety Requirements

To evaluate Angeles Link's technical feasibility, and in accordance with the Phase 1 Decision,[13] the Safety Study assessed the safety of pipeline transmission, storage, and transportation of hydrogen and applicable safety regulatory requirements and industry standards for employees, contractors, infrastructure, and public safety. The evaluation also considered how SoCalGas can refine and expand its existing operations and maintenance procedures and safety practices to support Angeles Link. In accordance with OP 5(c), the Safety Study evaluated federal, state and industry codes and standards, industry incidents, and best practices, such as Title 49 Code of Federal Regulations (CFR) Part 192 governing the transportation of natural and other gas by pipeline such as hydrogen, and American Petroleum Institute Recommended (API) Best Practice 1173, which establishes pipeline safety management systems. The evaluation included company standards, material specifications, third-party expert review, and data from other Phase 1 Studies (e.g., the Workforce and Design Study).

B. Workforce Planning & Training Evaluation

As part of evaluating potential public interest benefits, and in accordance with the Phase 1 Decision,[14] the Workforce Study estimated the potential job creation and workforce development associated with Angeles Link. The Workforce Study also evaluated federal and state design, construction, maintenance, inspection, and operational requirements and policies for a clean renewable hydrogen system, and explored potential educational pathways that could inform the development of future training programs and workforce planning. The Workforce

[13] Phase 1 Decision at 73-77 (OP 3(a), 3(e), 3(h), 5(a), 5(c), (d), 6(f), 6(n)).

[14] *Id.* at 73-77 (OP 3(a), 3(e), 3(h), 5(a)-(d), 6(e), 6(n)).

Study was completed through literature review, employment impact analysis, and data from other Phase 1 Studies, including the Design Study.

C. Pipeline Sizing & Design Criteria

To evaluate Angeles Link's technical feasibility, and in accordance with the Phase 1 Decision,[15] the Design Study established a preliminary engineering and design basis for the transport of clean renewable hydrogen via pipeline.[16] This study assessed potential pipeline sizes for the pipeline route from production to end use, identified potential materials for the pipeline system, evaluated compression characteristics and options, and estimated preliminary costs to support the evaluation of other Phase 1 Studies.

D. Preliminary Routing/Configuration Analysis

To evaluate Angeles Link's technical feasibility, and in accordance with the Phase 1 Decision,[17] the Routing Analysis evaluated potential routing and configuration options for Angeles Link, including consideration of various factors such as engineering requirements and environmental and social impacts, and identification of potential directional routes for the system. The study examined existing pipeline corridors, designated federal energy corridors, federal regulations, policies and agency datasets from regulatory agencies such as Pipeline and Hazardous Materials Safety Administration (PHMSA), in accordance with OP 5(c), as well as the need for new rights-of-way. Potential directional routes presented in the evaluation aimed to connect two SoCalGas segments identified within the California Hydrogen Hub,[18] and a potential route variation was introduced to reduce mileage through disadvantaged communities (DAC) in response to stakeholder comments and in accordance with OP 5(b).

IV. MANAGEMENT AND OVERSIGHT OF ENGINEERING & DESIGN STUDIES

SoCalGas prudently managed the Engineering & Design Studies by optimizing internal and external resources, maintaining financial oversight, managing scope and schedule, and

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[15] *Id.* at 73-76 (OP 3(a), 3(e), 3(h), 5(a), 5(c)-(e), 6(d), 6(f), 6(i), 6(n)).

[16] Produced with a carbon intensity equal to or less than four kilograms of carbon dioxide-equivalent produced on a lifecycle basis per kilogram and does not use any fossil fuel in its production process. *Id.* at 73 (OP 3(a)).

[17] *Id.* at 73-77 (OP 3(a), 3(d), 3(e), 3(h), 5(a)-(d), 6(i), 6(l), 6(n), 6(p)).

[18] *See* Chapter 1 (Direct Testimony of Shirley Arazi and Amy Kitson) for additional details regarding the California Hydrogen Hub.

controlling costs. As contemplated in the Phase 1 Decision, SoCalGas began conducting the feasibility studies immediately. To facilitate a quick ramp up in selecting vendors, SoCalGas maintains a selection of vetted contractors with pre-negotiated rates and demonstrated expertise in a range of capabilities (e.g., engineering, land and environmental services). These firms each have a master services agreement (MSA) with SoCalGas defining pre-negotiated terms and conditions typically through a prior competitive bidding process. The MSA process enables SoCalGas to have greater certainty about the firm's capabilities, safety record, dedicated staff and staffing levels, and insurance requirements and billing rates, and provides opportunities to engage with diverse businesses. Pre-negotiated market billing rates provide cost predictability and typically do not escalate over the life of the contract, resulting in typically lower than standard vendor contract rates which helps minimize cost and support ratepayer affordability in alignment with OP 5(a).

SoCalGas initiated a competitive bid process among firms with existing MSAs to obtain support for the Engineering & Design Studies. Through a request for proposal (RFP) process, SoCalGas received bids from four engineering firms and ultimately selected Burns & McDonnell (BMcD) to support the Engineering & Design Studies based on their capabilities, experience, and the cost-effectiveness of their proposal. To promote efficiency and consistency, multiple interrelated studies were consolidated under a single contract with BMcD, allowing for the integration of specialized expertise while providing cohesive project management, streamlined coordination, and effective oversight of interdependencies (e.g. areas identified as high potential for renewable hydrogen and the potential directional routes).[19] SoCalGas engaged additional third-party contractors to support specific areas where necessary.

SoCalGas implemented a disciplined and proactive schedule and cost management approach while maintaining quality and alignment with the other feasibility studies, incorporating stakeholder feedback, and meeting the requirements of the Phase 1 Decision. From the outset, strategies were established to optimize resource allocation, promote strong financial oversight, and ultimately complete the required studies in accordance with the Phase 1 Decision. A time-and-material (T&M) contract structure was selected to provide flexibility for incorporating stakeholder input and adapting to interdependencies among the Engineering &

[19] The BMcD agreement also included the Production Study. *See* Chapter 3 (Direct Testimony of Vijai Atavane) for further details.

Design Studies. A structured financial oversight process was implemented, where monthly reviews of budgeted hours and expenditures were conducted against actuals to monitor contractor performance and expenditures.[20] This process allowed for assessment of cost performance to utilize resources efficiently and adjust proactively as needed. A structured invoice review process was also in place where invoices were reviewed against activities and deliverables to confirm that costs accurately reflected work performed. These measures enhanced transparency, maximized efficiency, and controlled costs.

Early alignment on scope and technical approach helped focus efforts and maintain scope discipline. To manage progress and promote efficiency, SoCalGas conducted regular meetings with the third-party contractor for status updates. During the initial planning period, joint meetings allowed cross-study alignment among all studies within the contract. As work advanced, this process evolved into focused, one-on-one meetings between third-party contractor study leads and their assigned SoCalGas project managers to address study-specific needs more efficiently while incorporating stakeholder feedback throughout the process.

Angeles Link project managers held regular internal meetings to review study interdependencies (examples of which are provided in the sections below) and confirm alignment across workstreams. During these meetings, internal personnel synthesized and resolved issues where possible, elevating unresolved issues to contractors as needed. The meetings also streamlined the identification and delivery of relevant data to contractors. Additionally, where feasible, SoCalGas utilized reputable and publicly available data and platforms and leveraged existing professional organization participation and subscriptions, to support evaluations and reduce costs. Furthermore, SoCalGas actively engaged and collaborated with internal subject matter experts across the company to guide approach and validate efforts on the Engineering & Design Studies from Safety, Gas Engineering & System Integrity, Human Resources, Gas Control & System Planning, Construction, Strategy & Sustainability, and Regional Public Affairs organizations, drawing on a wide range of institutional knowledge within the company and reducing reliance on third-party contractors.

As explained in Chapter 2 (Direct Testimony of Frank Lopez), throughout the development of the studies, in accordance with OP 3(e) and OP 5(d), SoCalGas presented

[20] *See* Chapter 1 (Direct Testimony of Shirley Arazi and Amy Kitson) for further details on management and cost control oversight.

opportunities for stakeholders to provide feedback at four key milestones: (1) scope of work, (2) technical approach, (3) preliminary data and findings, and (4) draft study. These milestones were selected because they represented critical points at which relevant feedback could meaningfully influence the Phase 1 Studies. SoCalGas considered stakeholder feedback and incorporated feedback where appropriate. For example, in response to stakeholder feedback, in the Routing Analysis, a route variation to the potential directional routes was identified for further consideration to potentially minimize impacts to DACs. Additionally, in response to stakeholder feedback, SoCalGas requested the Center for Hydrogen Safety to conduct a third-party review of the draft Safety Study. Written responses to stakeholder feedback were also provided in quarterly reports in accordance with OP 3(h). Review, consideration, and incorporation of stakeholder feedback resulted in targeted adjustments to scope, schedule, and cost, where necessary.

The following sections further describe the prudent management and oversight of each study.

A. Evaluation of Applicable Safety Requirements

As described in Section III.A, SoCalGas prepared the Safety Study in accordance with the Phase 1 Decision. The Safety Study assessed the safety of pipeline transmission, storage, and transportation of hydrogen, and applicable safety requirements and industry standards for employees, contractors, infrastructure, and public safety. Throughout Phase 1, the dedicated Angeles Link team collaborated on the Safety Study with third-party contractors and leveraged internal experience. The scope and activities associated with the Safety Study evolved over time, were informed by stakeholder input, and aligned with the Phase 1 Decision. The loaded O&M costs incurred to prepare the Safety Study total $0.6 million and include labor and non-labor costs incurred during Phase 1.[21] The following sections describe the activities undertaken throughout the development of the Safety Study—from the initial contracting stage, to integration of stakeholder input at the four key milestones (i.e., scope, technical approach, preliminary findings and draft study), to completion of the final study.

[21] Refer to my accompanying Chapter 5 Workpapers for additional information.

1. Initiation – Scope of Work

The development and execution of the Safety Study was driven by the technical and project management expertise of internal SoCalGas personnel, leveraging internal subject matter experts (SMEs) in the SoCalGas Safety and Gas Engineering & System Integrity organizations. Initial activities included the development of a scope of work, coordination and alignment with other studies, and identification of internal subject matter experts. At this stage, third-party contractor BMcD supported the development of the scope of work and assisted with defining key deliverables, estimating the required effort, and establishing initial project control measures, including meeting cadence, schedule, and resources. The scope of work defined the foundational parameters of the Safety Study, establishing the study's objectives and focus areas, and served as the basis for contractor engagement, internal coordination, and early stakeholder engagement. The scope of work was developed through internal review and discussion, feedback from internal subject matter experts, and collaboration with BMcD.

In accordance with OP 3(e) and OP 5(d), SoCalGas presented the scope of work for the Safety Study to the PAG and CBOSG in July 2023. In response to stakeholder feedback, the scope of work was refined to broaden collaboration with external partners such as community colleges and ports, and to include a high-level review of existing safety programs for their applicability to 100% hydrogen systems. Stakeholders also emphasized the value of incorporating real-world lessons learned from hydrogen projects. Based on this feedback, SoCalGas expanded the original scope of work to include how lessons learned are captured and addressed through internal systems and protocols in addition to insights from real-world hydrogen projects. In direct response to stakeholder feedback recommending the Center for Hydrogen Safety (CHS) as a key resource, SoCalGas engaged the Hydrogen Safety Panel (HSP), established by the U.S. Department of Energy (DOE),[22] to provide third-party expert review and support, specific to best practices for safety in operation, handling, and use of hydrogen and

[22] The "Hydrogen Safety Panel" was created by the DOE to oversee and ensure safety practices in all hydrogen projects funded by the DOE, primarily focusing on the safe operation, handling, and use of hydrogen systems across all applications; it is led by the Pacific Northwest National Laboratory (PNNL). For additional information regarding Hydrogen Safety Panel, *see* Center for Hydrogen Safety, *Hydrogen Safety Panel, available at:* https://www.aiche.org/chs/hydrogen-safety-panel.

hydrogen systems. Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[23]

2. Planning – Technical Approach

The technical approach for the Safety Study provided a plan for how the evaluation would be systematically conducted and was jointly developed by SoCalGas and BMcD. The technical approach was developed with a focus on alignment with SoCalGas's Safety Management System (SMS) framework, which draws on API Recommended Practice 1173.[24] The technical approach prioritized the evaluation of hydrogen as a fuel, including its physical and chemical properties, associated risks, and industry best practices for safe handling and transport. The technical approach was developed through internal review and discussion, SME evaluation, incorporation of stakeholder feedback, and collaboration between SoCalGas and BMcD.

In accordance with OP 3(e) and OP 5(d), in September 2023, SoCalGas solicited feedback from the PAG and CBOSG on the technical approach. Based on the input received, the approach was refined to broaden the study's scope of the codes and standards assessment. Rather than focusing the review on leak detection and employee safety, the evaluation was expanded to include all relevant company standards, specifications, and protocols. Based on the input received and further internal review, the Technical Approach was realigned to include consideration of operations and maintenance such as emergency response procedures, hydrogen personal protective equipment (PPE), physical and cyber security, and potential future odorization components (considerations originally identified for evaluation within the Design Study). Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[25]

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[23] *See* Q3 2023 Angeles Link Phase 1 Quarterly Report Appendices at 3-68.

[24] API 1173 is a "pipeline" safety management system, designed to support the safe delivery of energy with safe pipeline operations by helping pipeline operators understand, manage, and continuously improve safety.

[25] *See* Q4 2023 Angeles Link Phase 1 Quarterly Report Appendices at 167-211.

3. Execution

a. Preliminary Data and Findings

The preliminary findings represented the initial output of the Safety Study and were developed through regular working sessions between SoCalGas and BMcD. In accordance with OP 3(e) and OP 5(d), the preliminary findings were shared with the PAG and CBOSG in March 2024. In response to stakeholder feedback, SoCalGas made several key updates to the evaluation, including incorporating additional details on odorants, hazard analysis, and risk and mitigation strategy. Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[26]

b. Draft and Final Study

The draft study compiled analyses and research, elaborated on preliminary findings, and incorporated stakeholder feedback where appropriate. In accordance with OP 3(e) and OP 5(d), the draft study was shared with the PAG and CBOSG in June 2024. Based on stakeholder feedback, the Safety Study was revised to include a broader review of industry standards, adding more information on international codes and how those apply to hydrogen as compared to natural gas pipelines. Additionally, in response to comments received from HSP, SoCalGas made several modifications that included providing a clearer study title appropriate for this feasibility phase, providing more detail on its Safety Management System (SMS), focusing on procedures that can impact design and operations, and emphasizing a root cause analysis as part of lessons learned. Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[27] The final study was published in December 2024.

B. Workforce Planning & Training Evaluation

As described in Section III.B, SoCalGas prepared the Workforce Study in accordance with the Phase 1 Decision. The Workforce Study evaluated the potential job creation and workforce development associated with Angeles Link. Throughout Phase 1, SoCalGas collaborated on the Workforce Study with third-party contractors and leveraged internal experience and expertise. The scope and activities associated with the Workforce Study evolved

[26] *See* Q1 2024 Angeles Link Phase 1 Quarterly Report Appendices at 327-418; *see also* Q2 2024 Angeles Link Phase 1 Quarterly Report Appendices at 396-556.

[27] *See* Q3 2024 Angeles Link Phase 1 Quarterly Report Appendix 3: SoCalGas Response to Comments.

over time, were informed by stakeholder input, and aligned with the Phase 1 Decision. The loaded O&M costs incurred to prepare the Workforce Study total $0.7 million and include labor and non-labor costs.[28] The following sections describe the activities undertaken throughout the development of the Workforce Study—from the initial contracting stage, to integration of stakeholder input at four key milestones (i.e., scope, technical approach, preliminary findings and draft study), to completion of the final study.

1. Initiation – Scope of Work

The development and execution of the Workforce Study were driven by the technical and project management expertise of internal SoCalGas personnel, leveraging internal SMEs in the SoCalGas Safety, Human Resources, Operations, and Gas Engineering & System Integrity organizations. Initial activities included the development of scope of work, coordination and alignment with other studies, and identification of internal SMEs. At this stage, third-party contractor BMcD supported the development of the scope of work and assisted with defining key deliverables, estimating the required effort, and establishing initial project control measures, including meeting cadence, schedule, and resources.

The scope of work defined the foundational parameters of the Workforce Study, establishing the study's objectives and focus areas, including compliance with regulatory requirements such as General Order No. 112-F, State of California Rules Governing Design, Construction, Testing, Operation, and Maintenance of Gas Gathering, Transmission, and Distribution Piping Systems, and served as the basis for contractor engagement, internal coordination, and early stakeholder engagement. The scope of work was developed through internal review and discussion, feedback from internal subject matter experts, and collaboration with BMcD.

In accordance with OP 3(e) and OP 5(d), SoCalGas presented the scope of work for the Workforce Study to PAG and CBOSG in July 2023. In response to stakeholder feedback, the scope of work was modified to include an estimate of jobs created, completed by a sub-contractor under BMcD, and additional opportunities for partnering with local training centers, colleges, and industry, supported by third-party contractor Det Norske Veritas (DNV).

[28] Refer to my accompanying Chapter 5 Workpapers for additional information.

Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[29]

2. Planning – Technical Approach

The technical approach for the Workforce Study was structured to prioritize key workforce-related factors that could inform future decision-making. The technical approach was developed through internal review and discussion, SME evaluation, incorporation of stakeholder feedback, and collaboration between SoCalGas and BMcD. In accordance with OP 3(e) and OP 5(d), SoCalGas shared the technical approach with the PAG and CBOSG in September 2023. Based on stakeholder feedback, the technical approach was modified to include consideration of operational qualifications, leak survey, and personnel training considerations originally identified for evaluation within the Design Study. Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[30]

3. Execution

a. Preliminary Data and Findings

The preliminary findings represented the initial output of the Workforce Study and were developed through regular working sessions with BMcD. Based on thematic feedback from stakeholders, the identification of potential benefits associated with workforce that may materialize in communities as a result of Angeles Link, known as an Employment Impact Analysis,[31] was conducted to identify economic and workforce opportunities near potential directional routes, in accordance with OP 5(b). In accordance with OP 3(e) and OP 5(d), in April 2024, SoCalGas shared the preliminary findings with the PAG and CBOSG. As a result of stakeholder feedback, key modifications were made to the Workforce Study, including expansion of the applicable programs and plans for employee safety. Additionally, in response to stakeholder feedback, the identification of existing education and training programs was added to the study. In addition, the study highlighted the community engagement and employment network that would be beneficial for recruitment efforts to add further focus on identifying

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[29] *See* Q3 2023 Angeles Link Phase 1 Quarterly Report Appendices at 3-68.

[30] *Id*.

[31] Employment Impact Analysis was conducted to estimate the potential economic and employment impact of Angeles Link. This analysis identified the potential direct, indirect, and induced economic and employment impacts disaggregated by county.

benefits for communities along potential directional routes. Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[32]

b. Draft and Final Study

The draft study compiled analyses and research, elaborated on preliminary findings, and incorporated stakeholder feedback where appropriate. In accordance with OP 3(e) and OP 5(d), the draft study was shared with the PAG and CBOSG in July 2024. Based on stakeholder feedback, the Workforce Study was expanded to include areas of additional analysis on workforce planning and safety as it pertains to constructing and operating a hydrogen pipeline system. Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[33]

The final study was published in December 2024, which confirms that Angeles Link can offer public interest benefits to the State through economic opportunities and new jobs to the region. The evaluation demonstrated that Angeles Link can create nearly 53,000 direct construction-related jobs and a total of approximately 75,000 jobs when considering indirect jobs (i.e., jobs generated in related industries that support Angeles Link) and induced jobs that occur through wage earners spending income.

C. Pipeline Sizing & Design Criteria

As described in Section III.C, SoCalGas prepared the Design Study in accordance with the Phase 1 Decision. The Design Study established the preliminary engineering and design basis for the transport of clean renewable hydrogen via pipeline and assessed potential pipeline sizes, routes, materials, operational characteristics and options, and estimated the preliminary costs of Angeles Link. Throughout Phase 1, SoCalGas collaborated on the Design Study with third-party contractors and leveraged internal experience and expertise. This study was foundational to Phase 1, iterating with the Routing Analysis and directly informing the Alternatives, Cost-Effectiveness, and Workforce Studies. The scope and activities associated with the Design Study evolved over time, were informed by stakeholder input, and aligned with the Phase 1 Decision. The loaded O&M costs incurred to prepare the Design Study total $0.9

[32] *See* Q2 2024 Angeles Link Phase 1 Quarterly Report Appendices at 396-556.

[33] *See* Q3 2024 Angeles Link Phase 1 Quarterly Report Appendix 3: SoCalGas Response to Comments.

million and include labor and non-labor costs.[34] The following sections describe the activities undertaken throughout the development of the Design Study—from the initial contracting stage, to integration of stakeholder input at four key milestones (i.e., scope, technical approach, preliminary findings and draft study), to completion of the final study.

1. Initiation – Scope of Work

The development and execution of the Design Study was driven by the technical and project management expertise of internal SoCalGas personnel, leveraging internal SMEs in the SoCalGas Gas Control & System Planning, Construction, Gas Engineering & System Integrity, and Strategy & Sustainability organizations, where relevant. Initial activities included the development of a scope of work, coordination and alignment with other studies, and identification of internal subject matter experts. At this stage, third-party contractor BMcD supported the development of the scope of work and assisted with defining key deliverables, estimating the required effort, and establishing initial project control measures, including meeting cadence, schedule, and resources.

The scope of work defined the foundational parameters of the Design Study, establishing the study's objectives and focus areas, and served as the basis for contractor engagement, internal coordination, and early stakeholder engagement. The scope of work was developed through internal review and discussion, feedback from internal subject matter experts, and collaboration with BMcD. The Design Study was scoped in compliance with the Phase 1 Decision including the estimation of preliminary costs to support the Alternatives Study, evaluation of safety concerns, identification and comparison of potential routes and configurations, and consideration of California public policies, in accordance with the broader requirements in OP 6(d), 6(f), 6(i), and 6(n).

In accordance with OP 3(e) and OP 5(d), SoCalGas shared the scope of work with the PAG and CBOSG in July 2023. In response to stakeholder feedback, the scope of work was modified to include high-level consideration of resiliency and reliability in pipeline sizing and compression option analysis. Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[35]

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[34] Refer to my accompanying Chapter 5 Workpapers for additional information.

[35] *See* Q3 2023 Angeles Link Phase 1 Quarterly Report Appendices at 3-68.

2. Planning – Technical Approach

The technical approach defined the analytical framework and methodologies used to assess hydrogen pipeline system modeling across various scenarios and was jointly developed by SoCalGas and BMcD. The technical approach for the Design Study was developed to integrate engineering principles, industry best practices, and practical constraints with the findings of the other Phase 1 Studies in a way that was cost-effective, technically sound, and allowed for the comparison of possible directional routes and configurations. The technical approach was developed through internal review and discussion, SME evaluation, incorporation of stakeholder feedback, and collaboration between SoCalGas and BMcD.

In accordance with OP 3(e) and OP 5(d), SoCalGas shared the technical approach with the PAG and CBOSG in September 2023.[36] Based on stakeholder feedback, the technical approach was revised to broaden the scope to include an assessment of pipeline repurposing for material compatibility and risk, which was supported by third-party contractor RSI. Additionally, stakeholder feedback regarding reliance on electricity for end-use demand led to the inclusion of a literature review on electric reliability performed by SoCalGas SMEs. Stakeholders also requested multiple scenarios for pipeline routing and different ways of disaggregating production to be examined, with demarcation of interstate and intrastate assumptions clearly identified.[37] Based on this feedback, multiple route configurations were evaluated for differences within potential design requirements. In addition, in response to stakeholder feedback, additional emphasis on safety and leak prevention was incorporated into the design development section. Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[38]

3. Execution

a. Preliminary Data and Findings

The preliminary findings represented the initial output of the Design Study and were developed through regular working sessions with BMcD. As preliminary data and findings were

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[36] SoCalGas presented the draft technical approach to the PAG in October 2023, as requested by the PAG.

[37] Only intrastate options were considered for the potential directional routes identified through the feasibility Routing Analysis.

[38] *See* Q4 2023 Angeles Link Phase 1 Quarterly Report Appendices at 167-211.

generated, the Design Study received volumetric information from the Production Study and the Demand Study, and routes were iterated between the Routing Analysis and hydraulic modeling of the Design Study. In accordance with OP 3(e) and OP 5(d), SoCalGas shared the preliminary findings with the PAG and CBOSG in May 2024. In response to stakeholder feedback, additional content was incorporated on potential impact radius (PIR)[39] within both the Design Study as well as within the Safety Study. Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[40]

b. Draft and Final Study

The draft study compiled analyses and research, elaborated on preliminary findings, and incorporated stakeholder feedback where appropriate.[41] In accordance with OP 3(e) and OP 5(d), the draft study was shared with the PAG and CBOSG in July 2024. Based on stakeholder feedback, discussion on leak prevention and minimization opportunities and potential impact radius were incorporated into the Design Study. Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[42] The final study was published in December 2024.

D. Preliminary Routing/Configuration Analysis

As described in Section III.D, SoCalGas prepared the Routing Analysis in accordance with the Phase 1 Decision. The Routing Analysis considered a wide range of initial corridors and configurations and identified potential directional routing options for Angeles Link. Throughout Phase 1, SoCalGas collaborated on the Routing Analysis with third-party contractors and leveraged internal experience and expertise. This study was foundational to Phase 1, iterating with the Design Study and ESJ Plan/Screening[43] and directly informing the GHG,

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[39] The potential impact radius (PIR) is utilized to determine high and moderate consequence areas along a pipeline that will inform the development of an integrity management program, as required by 49 CFR Part 192 Subpart O – Gas Transmission Pipeline Integrity Management.

[40] *See* Q2 2024 Angeles Link Phase 1 Quarterly Report Appendices at 396-556.

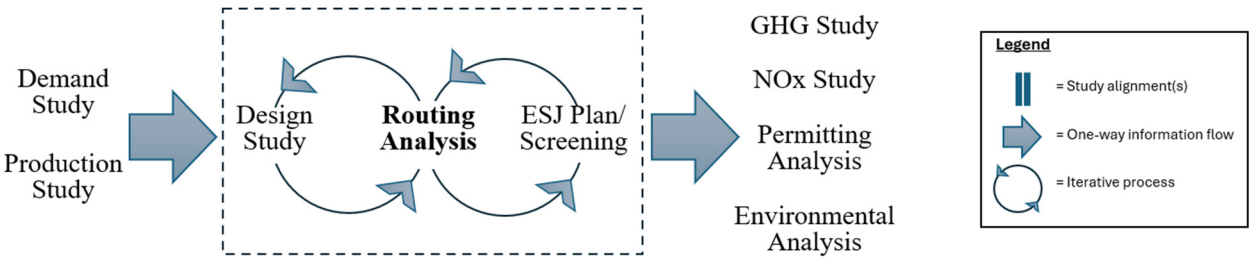
[41] In response to stakeholder feedback and to better align third-party areas of focus, third-party storage was addressed in the Production Study.

[42] *See* Q3 2024 Angeles Link Phase 1 Quarterly Report Appendix 3: SoCalGas Response to Comments.

[43] *See* Chapter 2 (Direct Testimony of Frank Lopez) for additional information regarding SoCalGas's ESJ Plan and Screening.

NOx,[44] and Permitting Studies, and Environmental Analysis.[45] See Figure 1 below for visual representation of study interdependencies. The scope and activities associated with the Routing Analysis evolved over time, were informed by stakeholder input, and aligned with the Phase 1 Decision. The loaded O&M costs incurred to prepare the Routing Analysis total $1.5 million and include labor and non-labor costs incurred.[46] The following sections describe the activities undertaken throughout the development of the Routing Analysis —from the initial contracting stage, to integration of stakeholder input at four key milestones (i.e., scope, technical approach, preliminary findings and draft study), to completion of the final study.

Figure 1: Routing Analysis Interdependency Diagram



1. Initiation – Scope of Work

The development and execution of the Routing Analysis was driven by the technical and project management expertise of internal SoCalGas personnel, leveraging internal SMEs in the SoCalGas Gas Control & System Planning, Regional Public Affairs, and Gas Engineering organizations, where applicable. Initial activities included the development of scope of work, coordination and alignment with other studies, and identification of internal subject matter experts. At this stage, third-party contractor BMcD supported the development of the scope of work and assisted with defining key deliverables, estimating the required effort, and establishing initial project control measures, including meeting cadence, schedule, and resources.

The scope of work defined the foundational parameters of the Routing Analysis, establishing the study's objectives and focus areas, and served as the basis for contractor engagement, internal coordination, and early stakeholder engagement. The scope of work was

[44] The Routing Analysis provided the estimated Angeles Link mileage for the compressor emissions modeling.

[45] *See* Chapter 4 (Direct Testimony of Jessica Kinnahan Foley) for additional information regarding the GHG, NOx, and Permitting Studies, and Environmental Analysis.

[46] Refer to my accompanying Chapter 5 Workpapers for additional information.

developed through internal review and discussion, feedback from internal subject matter experts, and collaboration with BMcD. The Routing Analysis was scoped in compliance with the Phase 1 Decision including the identification and comparison of possible routes, consideration of California environmental law and public policies, identification of potential impacts to DAC and ESJ communities, and partnering with the State of California on its application for federal funding.[47]

In accordance with OP 3(e) and OP 5(d), SoCalGas presented the scope of work to the PAG and CBOSG in July 2023. Based upon stakeholder feedback, modifications were made to the scope of work to include certain social constraints (e.g., land uses, historic locations) and other pipeline features. Furthermore, consistent with this feedback, the scope of work was refined to include route evaluation assumptions, methodology, and pipeline attributes considered in the analysis. Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[48]

2. Planning – Technical Approach

The technical approach for the Routing Analysis considered a range of potential corridors and defined the analytical framework and attributes used to characterize initial route configurations across Central and Southern California. The technical approach was developed through internal review and discussion, SME evaluation, incorporation of stakeholder feedback, and collaboration between SoCalGas and BMcD. The analysis was divided into a system evaluation and route evaluation, allowing each step to be informed by the most current data, address stakeholder interests as they arose, and enhance the accuracy and relevance of the findings. This structure supported an iterative process that continuously integrated new information from various sources, including other Phase 1 Studies and available information related to the Alliance for Renewable Clean Hydrogen Energy Systems (ARCHES[49]), such as consideration of the two SoCalGas Hub Segments.

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47 *See* Chapter 1 (Direct Testimony of Shirley Arazi and Amy Kitson) for additional details regarding California's application for federal funding.

48 *See* Q3 2023 Angeles Link Phase 1 Quarterly Report Appendices at 3-68.

49 Co-founded by the Governor's Office of Business and Economic Development (GO-Biz), ARCHES is "California's designated U.S. Department of Energy [hydrogen hub], established to accelerate the deployment of renewable, clean hydrogen projects and infrastructure to advance a zero-carbon

In accordance with OP 3(e) and OP 5(d), SoCalGas shared the technical approach with the PAG and CBOSG in September 2023.[50] In response to stakeholder comments, the technical approach was refined to include further evaluation of multiple configurations and include costs for all potential directional routes. Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[51] After the announcement of the California Hydrogen Hub's funding award from the DOE in October 2023, the technical approach was also updated to incorporate information about other California Hydrogen Hub project(s) as relevant.

3. Execution

a. Preliminary Data and Findings

The preliminary findings represented the initial output of the Routing Analysis and were developed through regular working sessions with BMcD. As preliminary data and findings were generated, the Routing Analysis received locational information from the Production Study and the Demand Study, and routes were iterated between the Routing Analysis and hydraulic modeling of the Design Study to support design parameters and generation of cost estimates, in accordance with OP 5(e). In accordance with OP 3(e) and OP 5(d), SoCalGas presented the preliminary findings to the PAG and CBOSG in March 2024. In response to stakeholder feedback, and in accordance with OP 5(b), SoCalGas incorporated the results of the ESJ Screening[52] which resulted in a new route variation being added to the four potential directional routes (Route Variation 1). Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[53]

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economy." *See* GO-Biz, *California Awarded Up to $1.2 Billion to Advance Hydrogen Roadmap and Meet Climate and Clean Energy Goals* (October 13, 2023), *available at:* https://business.ca.gov/california-awarded-up-to-1-2-billion-to-advance-hydrogen-roadmap-and-meet-climate-and-clean-energy-goals/.

[50] SoCalGas presented the draft technical approach to the PAG in October 2023, as requested by the PAG.

[51] *See* Q3 2023 Angeles Link Phase 1 Quarterly Report Appendices at 3-68, Q4 2023 Angeles Link Phase 1 Quarterly Report Appendices at 167-211; *see also* Q1 2024 Angeles Link Phase 1 Quarterly Report Appendices at 327-418.

[52] *See* Chapter 2 (Direct Testimony of Frank Lopez) for additional information regarding SoCalGas's ESJ Plan and Screening.

[53] *See* Q2 2024 Angeles Link Phase 1 Quarterly Report Appendices at 396-556.

b. Draft and Final Study

The draft study compiled analyses and research, elaborated on preliminary findings, and incorporated stakeholder feedback where appropriate.[54] In accordance with OP 3(e) and OP 5(d), the draft study was shared with the PAG and CBOSG in July 2024. The Routing Analysis incorporated the SoCalGas Hub Segments in the criteria for selection of potential directional routes. The final study was published in December 2024. Responses to stakeholder feedback were provided in the quarterly report in accordance with OP 3(h) and OP 5(d).[55]

V. CONCLUSION

My testimony describes the prudent and reasonable execution of the Engineering & Design Studies. The costs presented in my testimony were incurred to conduct the Engineering & Design Studies, and incorporate stakeholder feedback, in accordance with the Phase 1 Decision. The Phase 1 Studies, including the Engineering & Design studies, confirmed Angeles Link's viability, feasibility, cost effectiveness, and potential public interest benefits to ratepayers and the broader community. Additional supporting information documenting the reasonableness of the costs incurred is contained in the supporting workpapers and serves to demonstrate the prudent execution and reasonableness of the costs incurred. Based on the information contained in my testimony and supporting workpapers, the Commission should find reasonable the costs incurred in executing Phase 1 of Angeles Link.

This concludes my prepared direct testimony.

[54] The Right-of-Way Study and Franchise Study were combined with the Routing Analysis to better deliver results relative to routes.

[55] *See* Q3 2024 Angeles Link Phase 1 Quarterly Report Appendix 3: SoCalGas Response to Comments.

VI. WITNESS QUALIFICATIONS

My name is Katrina A. Regan. I have been employed by SoCalGas since 2011. I have held numerous positions with increasing levels of responsibility including Associate Region Engineer, Lead Technical Supervisor, Field Project Advisor, Gas Control Outage Coordination Lead, and Business Development Project Manager.

My current position is Hydrogen Engineering & Strategy Manager. I have a Bachelor's degree in Civil Engineering from Loyola Marymount University. I have a Master's degree in Business Administration in Infrastructure Technology and Finance as well as a Graduate Certificate in Renewable Energy Engineering from University of Massachusetts, Lowell.

I have not previously testified before the Commission.