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BY E-MAIL AND U.S. MAIL

Elizaveta Malashenko
Deputy Executive Director
Safety and Enforcement
California Public Utilities Commission
505 Van Ness Avenue
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Jason Marshall
Acting State Oil and Gas Supervisor
California Department of Conservation
Division of Oil, Gas and Geothermal Resources
801 K Street, MS 24-01
Sacramento, CA 95814

RE: The Blade Report

Dear Ms. Malashenko and Mr. Marshall:

This letter is in response to the California Public Utilities Commission’s (“CPUC”) and Division of Oil, Gas and Geothermal Resources’ (“Division” or “DOGGR”) joint letter dated May 17, 2019 (the “May 17 Letter”) requesting that Southern California Gas Company (“SoCalGas”) respond to the Blade Energy Partners’ (“Blade”) May 16, 2019 Root Cause Analysis Report (“Blade Report”). The May 17 Letter requests, after SoCalGas “has had an opportunity to *fully review* the Blade root cause analysis,” that SoCalGas state its position with respect to the Blade Report’s findings, conclusions, and recommendations.¹ This request presents a substantial undertaking. The Blade Report is comprised of a Main Report and 27 Supplementary Reports, totaling over 2,500 pages. These reports are further supported by

¹ May 17 Letter at 1. (emphasis added). SoCalGas notes that in other proceedings, the Commission asked the utility the same, or substantially similar, questions within the OII itself, with regard to a Safety and Enforcement Division (“SED”) Staff Report (not a Pub. Util. Code §315 accident report), and *only after* SED made formal allegations in its Staff Report. See e.g., *Order Instituting Investigation and Order to Show Cause on the Commission’s Own Motion into the Operations and Practices of Pacific Gas and Electric Company with Respect to Locate and Mark Practices and Related Matters*, Dec. 14, 2018, I.18-12-007, pp. 11–12 (asking PG&E, among other things, to “[l]ist each factual contention stated, and conclusion reached, by the SED Report, regarding PG&E’s locate and mark practices, that PG&E contends is incorrect, and provide support for PG&E’s position.”).

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attachments, modeling, data, and analyses, which Blade only recently has started to provide to SoCalGas.

SoCalGas has not yet had an opportunity to *fully review* and evaluate the Blade Report, together with the attachments, modeling, data, and analyses underpinning Blade's findings, conclusions, and recommendations. Nevertheless, we provide the following in an effort to be responsive.

As a preliminary matter, SoCalGas maintains serious concerns regarding an apparent conflict of interest. As SoCalGas detailed in its June 13, 2019 letter to the Commission's General Counsel (attached) on June 4, 2019, SoCalGas learned that Mr. Kenneth Bruno—Program Manager in SED's Gas Safety and Reliability branch, and the CPUC's lead investigator for the October 23, 2015 Aliso Canyon gas leak—had filed a personal injury lawsuit against SoCalGas attributing certain health issues to the time he spent at Aliso Canyon during the leak.² Mr. Bruno's role as both the CPUC's lead investigator and a private personal injury plaintiff presents a profound conflict of interest that may have undermined, among other things, the Blade Report. As part of his role as lead investigator Mr. Bruno oversaw Blade's RCA investigation and, SoCalGas understands, was in regular contact with Blade personnel. SoCalGas has serious concerns about whether, and to what degree, Mr. Bruno, due to his conflict of interest, may have improperly influenced Blade's investigation. SoCalGas is particularly concerned here given that the Commission has diverged from its normal process of opening an OII only after preparation of a staff report which details the results of its independent investigation and, thus, seemingly is relying solely on the Blade Report.³

The Commission has not yet responded to SoCalGas' June 13 letter, but SoCalGas trusts the Commission is expeditiously and thoroughly investigating the degree to which Mr. Bruno inappropriately may have influenced Blade's RCA investigation.⁴ Further, while SoCalGas is informed that Mr. Bruno is now employed in a separate department within the Commission, SoCalGas has received no assurance that Mr. Bruno cannot access materials that are submitted to SED on a confidential basis. We emphasize that this response provides SoCalGas' preliminary assessment only, and is in no way intended to represent a thorough evaluation of the Blade Report. SoCalGas anticipates that it may more comprehensively address the Blade Report's findings, conclusions, and recommendations after it receives and analyzes all materials relied upon by Blade, and once specific allegations of violations are alleged by SED in the OII, which currently does not allege violations of CPUC or DOGGR regulations at the time of the leak.

² See Attachment A, June 13, 2019 letter from Southern California Gas Company to California Public Utilities Commission.

³ On June 27, 2019, the Commission opened *Order Instituting Investigation on the Commission's Own Motion into the Operations and Practices of Southern California Gas Company with Respect to the Aliso Canyon storage facility and the release of natural gas, and Order to Show Cause Why Southern California Gas Company Should not be Sanctioned for Allowing the Uncontrolled Release of Natural Gas from its Aliso Canyon Storage Facility*, I.19-06-016.

⁴ SoCalGas further notes that the scope of Blade's investigation went beyond the technical root cause of the SS-25 well failure. As part of its investigation into Mr. Bruno's conflict of interest, the Commission should review the extent to which Mr. Bruno may have inappropriately expanded the scope of Blade's root cause analysis investigation.

a) The Aliso Canyon Facility Is Safe.

In the months following the successful control of the leak, SoCalGas and state regulators, who worked in consultation with independent experts at the U.S. Department of Energy’s National Labs, conducted a comprehensive safety review of Aliso Canyon. That review recognized SoCalGas’ safety enhancements as the most rigorous and comprehensive in the nation. Of the 114 active wells at Aliso Canyon as of 2015:

- 66 wells have completed all tests; and
- 48 wells have been, or are in the process of being plugged and abandoned.⁵

As further detailed below, SoCalGas has also implemented the following safety measures:

- Withdrawing and injecting natural gas only through the inner steel tubing of those wells that have passed all tests and have been approved for use by the Division;
- Replacing the inner steel tubing of every approved well;
- Using the casing around the new inner steel tubing—tested to ensure integrity under pressure—to provide a physical, secondary barrier of protection against potential leaks; and
- Operating the facility at reduced pressure, as directed by CPUC.

SoCalGas has also introduced a suite of advanced leak-detection technologies and practices that allow for early detection of leaks and help to quickly identify anomalies, such as changes in well pressure. These enhancements include:

- An infrared fence-line methane detection system with eight pairs of infrared methane monitors;
- Around-the-clock monitoring of the pressure in all wells from SoCalGas’ 24-hour operations center;
- Daily patrols to visually examine every well;
- Daily scanning of each well using sensitive infrared thermal imaging cameras that can detect leaks;
- Real-time wellhead LEL monitors for leak detection on all wells at all fields, and upwind/downwind ambient monitoring and meteorological stations at all fields; and
- Enhanced training for employees and contractors.

SoCalGas has also assessed the potential geologic, seismologic, and geomechanical hazards at Aliso Canyon, including landslides, ground shaking, and fault displacement. SoCalGas assembled a team of renowned experts in various scientific and engineering fields to conduct the geologic, seismologic, and geomechanical studies. Their work plans were reviewed and approved by DOGGR and independent experts from the Lawrence Berkeley National Laboratory (“LBNL”). Draft reports of the studies were made available to DOGGR and the LBNL on March 20, 2019.

⁵ The decision to abandon these wells was driven by various factors including operational circumstances, deliverability (wells where the cost to recomplete the well was high and the resulting deliverability was low), fluid production (wells which would likely not flow at current inventory and pressure limits), and well integrity (burst calculations were based on the conservative Barlow formula to determine the capability to withstand 115% of maximum allowable operating pressure across the entire string).

Ultimately, the above enhancements are consistent with a key conclusion of the Blade Report, and what the CPUC and DOGGR determined more than two years ago: Aliso Canyon is safe, and the industry-leading safety enhancements and new regulations put in place after the leak should prevent an Aliso Canyon-type of incident from occurring again.⁶

SoCalGas continues to support industry experts in their research efforts. For instance, SoCalGas is currently supporting the LBNL in its effort to develop an integrated risk management and decision support system for underground gas storage. SoCalGas is providing internal resources for discussion and technical input, and for installation of monitoring technologies, staff to interact and coordinate with LBNL for data collection, and access to relevant data. This is just one of several projects that SoCalGas is currently supporting to advance underground storage safety.

b) Preliminary Concerns with the Blade Report’s Findings and Conclusions.

SoCalGas understands that the Blade Report concluded that a rupture in the outer casing of the well occurred on the morning of October 23, 2015, followed hours later by a complete separation of the casing. According to the report, microbial-induced corrosion caused the metal in the outer casing to thin, which led to the rupture. Significantly, however, the Blade Report confirms that SoCalGas complied with gas storage regulations in existence at the time of the leak and that the related compliance activities conducted prior to the leak did not reveal indications of a casing integrity issue. Blade also determined that SoCalGas’ current practices and new state regulations address most, if not all, of the causes identified in the report.

While SoCalGas agrees with the Blade Report’s conclusions that SoCalGas complied with then-existing regulations and that Aliso Canyon is safe, SoCalGas’ preliminary review of the Blade Report has revealed a number of concerns with Blade’s findings and conclusions. The Blade Report was prepared with the benefit of hindsight and years of investigation, modeling and lab work, and it makes many root cause findings based on false assumptions and speculation.⁷ By way of example only, SoCalGas provides the following list of findings in the Blade Report that appear incorrect, misleading, and/or highly questionable due to reliance on false assumptions and speculation.

- **The Blade Report Improperly Inflates the Number of Casing Leaks Discovered.**
The Blade Report asserts that Blade reviewed 124 gas storage wells and identified 63

⁶ Notably, during Blade’s August 2, 2019 webinar presentation on the Blade Report, Blade’s lead author, Ravi Krishnamurthy, confirmed that with the solutions implemented it would be “highly improbable” for another Aliso Canyon-type incident to occur. See also, CPUC Letter to Kenneth Harris, SB 380 Concurrence Letter, July 19, 2017, available at: https://www.cpuc.ca.gov/uploadedFiles/CPUC_Public_Website/Content/News_Room/News_and_Updates/7-19-17_CPUC_LtrtoKenHarrisDOGGRreSB380Concurrence.pdf.

⁷ SoCalGas notes that it was incumbent upon Blade to ask any questions, seek any documents relevant to its investigation, and interview any witnesses that it found important to its investigation. SoCalGas cooperated with all aspects of Blade’s investigation, and respected Blade’s independence—as Blade itself acknowledges. See, Main Report at 242 (“SoCalGas’s willing support and cooperation for all aspects of RCA work including providing data for numbers data requests.”) Blade further acknowledges “SoCalGas’s support of the independence of [the RCA] investigation.”)

casing leaks. The Blade Report makes a number of errors in its evaluation of these wells. The Blade Report inflates the number of leaks identified by including casing leaks from pre-gas storage operation and leaks identified during the wells' conversion from oil production wells to gas storage wells—even though these leaks predated SoCalGas' gas storage operations. Blade further inflates the number of casing leaks by including several stage collar leaks. Stage collar leaks are not leaks in the production casing and are fundamentally different from casing leaks, which may be typified by casing holes or splits. SoCalGas is still evaluating the full extent of the errors Blade has made with respect to its evaluation of "casing leaks" and anticipates identifying additional errors after a more comprehensive review. In addition, even Blade identifies that only a few of these "leaks" were of a similar nature as the SS25 occurrence and does not state how a root cause investigation could have occurred without the extensive RCA investigation performed on SS25. Blade does state that the leaks were immediately addressed consistent with standard industry practices.

- **The Blade Report's Estimate for the Total Gas Volume Released During the Leak Is Highly Speculative.** The Blade Report estimated that 6.6 Billion Standard Cubic Feet ("Bscf") of gas was released during the leak, with a possible range of 5.9-7.2 Bscf.⁸ Blade arrived at this result based on modeling. However, the Blade Report provides little justification for why the results of its modeling are superior to the figure measured by the California Air Resources Board using the Scientific Aviation Measurements. Instead, Blade speculates that the Scientific Aviation's plane did not "necessarily represent the total leak" because "[h]ydrocarbons *could* have dispersed through the fracture matrix and taken an unknown path that delayed emissions to the air."⁹ The Blade Report, however, provides little support for this theory.
- **The Blade Report Speculates as to the Rate of Corrosion.** The Blade Report states that the rate of microbial-induced corrosion at SS-25 "would have been quite low, on an average of 5 to 10 mpy."¹⁰ However, as the Blade Report acknowledges in one of its Supplementary Reports, this is mere speculation: "[t]he exact corrosion rate for the 7 in. casing cannot be predicted because the limited information about the condition of the well, particularly the pH, alkalinity, temperature, and composition of the fluid in contact with the 7 in. casing OD over the entire life of the well."¹¹ Further, the Blade Report arrives at its corrosion rate estimate based on additional assumptions that it cannot substantiate, including: (1) that the SS-25 well connections were seeping carbon dioxide as early as 1977—the date gas injections first started, and (2) microbes were present at that time.¹²
- **The Blade Report's Conclusion that SoCalGas Did Not Perform Failure Analysis Is Incorrect and Misleading.** The casing leaks, as SoCalGas understands them to be identified in the Blade Report, were successfully assessed and addressed by SoCalGas

⁸ Main Report at 158.

⁹ Main Report at 156 (emphasis added).

¹⁰ Main Report at 123.

¹¹ Blade Report, Vol. 2, *Report on the analysis and results of the SS-25 7 in. casing failure*, (May 31, 2019), p. 209.

¹² *Id.*

and, where appropriate, further investigation was performed. In order to remediate any leaks, SoCalGas necessarily had to analyze and diagnose the issue, and then implement a fix, as needed. SoCalGas further notes that DOGGR was made aware of these leaks, and any remediation, through annual reviews, notices and permits, and mechanical integrity testing results.

- **The Blade Report Speculates that Real-Time Pressure Monitoring Would Have Prevented the Circumferential Parting of the Seven-Inch Casing.** Blade acknowledges that SoCalGas complied with regulations in existence at the time and makes no assertion that SoCalGas failed to comply with industry standard practices related to pressure monitoring. Blade nevertheless asserts that real-time pressure monitoring would have enabled SoCalGas to identify the leak sooner, which “*may* have prevented the cooling at the leak and parting of the 7 in. casing.”¹³ Blade’s conclusions are based entirely on speculation and assume there was sufficient time for operations to identify and investigate the anomalous pressure and take appropriate action. Blade’s report states the separation of the casings occurred within hours of the sudden part and while the well was still on injection without providing any explanation how the pressure in the tubing would have changed during the event so as to be recognized on any well pressure monitoring with sufficient time to take action.
- **The Blade Report Speculates that the Well Could Have Been Killed Earlier Using a Different Combination of Kill Fluid Density and Pump Rate.** The Blade Report suggests mistakes were made during the well kill effort and that the well could have been killed sooner had a heavier fluid been pumped at a higher rate. However, Blade’s supporting modeling seems to be based on assumptions and speculation. Blade’s findings and analysis on this issue seem to rely almost exclusively on Blade’s well kill modeling, which was performed years after the leak occurred, with perfect knowledge of the magnitude and location of the leak, and without sufficient input from parties involved.
- **Dual Barrier Operation Was Not Required by Regulation or Industry Standards.** While Blade identifies the lack of dual barrier design as a root cause, it fails to discuss the industry standard regarding dual barriers. Indeed, while all of SoCalGas’ operational injection and withdrawal wells are tubing-flow only today, the industry standard is still single barrier design, and the vast majority of other operators throughout the country—90%—operate with single barrier design. In this regard, it is noteworthy that the Blade Report fails to account for areas where SoCalGas exceeded industry standards, including with respect to operational practices.

Again, SoCalGas describes these high-level concerns for preliminary assessment purposes only, and anticipates that it will more comprehensively respond to the Blade Report after it has had adequate opportunity to fully evaluate the attachments, modeling, data, and analysis that support the Blade Report’s findings, and to the extent SED relies on the Blade Report in the OII. It bears noting that while SoCalGas does not agree with many of the Blade Report’s findings and conclusions, it has already implemented many of the recommendations identified,

¹³ Main Report at 239 (emphasis added).

as acknowledged by Blade, and is currently exploring the feasibility of implementing other recommendations described in the Blade Report.

c) Mitigation Solutions and Storage Safety Enhancements.

The Blade Report identifies twelve “mitigation solutions” that, according to Blade, would have mitigated or prevented the leak at SS-25.¹⁴ As the Blade Report notes, SoCalGas has already implemented most of these recommendations that Blade asserts would have mitigated or prevented the SS-25 incident.¹⁵ Indeed, many of these safety measures were in place at SoCalGas’ storage fields before the issuance of the Blade Report.

i. *Production Casing for New Wells Have Been Cemented to Surface Since the 1990s.*

Since approximately 1992, SoCalGas has made it a practice to cement production casings to surface.¹⁶ Today, for existing wells with production casings not cemented to surface, SoCalGas inspects production casing for wall loss, consistent with DOGGR Underground Storage (“UGS”) Regulations’ Mechanical Integrity Testing (“MIT”) requirements, which details methods such as magnetic flux or ultrasonic technologies.¹⁷

ii. *SoCalGas’ Well Integrity Management System Requires Wall Thickness Inspections.*

SoCalGas’ internal policies currently require casing wall thickness inspections to estimate internal and external corrosion. This requirement is incorporated into SoCalGas’ Storage Integrity Management Program (“SIMP”), which prioritizes interval reassessments based on risk.¹⁸ SoCalGas proposed SIMP—a forward-looking plan to assess and enhance the safety and integrity of SoCalGas’ storage wells—in 2014, even *before* federal and state underground gas storage regulations were promulgated.

SIMP was modeled after successful integrity management programs for SoCalGas’ pipeline system. The Pipeline and Hazardous Materials Safety Administration (“PHMSA”) began requiring transmission companies to develop a Transmission Integrity Management Program (“TIMP”) and Distribution Integrity Management Program (“DIMP”) in 2004 and 2006, respectively. SoCalGas identified the potential need for an equivalent program that involved well integrity and proactively proposed SIMP without waiting for regulations to be promulgated. This is consistent with SoCalGas’ ongoing improvement programs such as its Sewer Lateral Inspections Project (“SLIP”), Distribution Riser Inspection Project (“DRIP”),

¹⁴ The May 17 Letter refers to “recommendations” in the Blade Report. SoCalGas understands this to reference the twelve mitigation solutions identified by Blade. Two of the solutions (Solution Nos. 2 and 7) are focused strengthening regulations and, while SoCalGas supports strengthening regulations, these solutions are directed towards regulators and not SoCalGas. (See Main Report at pp. 231-233).

¹⁵ See *Id.* at 234 – 237.

¹⁶ 14 CCR 1726.5(b)(7)(B) provides that “intermediate and production casings, if not cemented to the surface, are cemented in accordance with the requirements of Section 1722.4.”

¹⁷ 14 CCR §1726.6 (a)(2)

¹⁸ The maximum reassessment interval for well casings is based on the calculated remaining life of the most severe defect condition on the casing.

and Gas Infrastructure Protection Project (“GIPP”), that were not industry standard or required by regulation. SoCalGas began a SIMP pilot program for well integrity and management work in 2014; its request for SIMP was approved by the CPUC in 2016; and SoCalGas has fully implemented SIMP today.

To be clear, SoCalGas was not waiting for SIMP to be approved by the CPUC before it began implementing SIMP activities. The SIMP pilots allowed SoCalGas to continue to test the usefulness of tools as they were being run at the storage field. At another field, La Goleta, real time pressure monitors were installed during the summer of 2015, prior to the Aliso Canyon incident. And the framework for a SIMP risk management plan was under development beginning in January 2014.

These are not the only areas in which SoCalGas was ahead of regulatory requirements. For example, SoCalGas was running ultrasonic inspection tools to test well integrity since 2008, including at Aliso Canyon. In fact, prior to October 2015, SoCalGas personnel had attended training at different vendors around the country to learn more about the development and effectiveness of potential new downhole tools, and SoCalGas was already in the process of transitioning from hard copy well files to digital well files to enhance accessibility by additional personnel and to promote increased ability to determine potential trends.

Today, SoCalGas has implemented an accelerated pace for completing its SIMP assessments for storage wells at all four storage fields from its original plan of six years to four years, and has completed approximately 90% of its baseline assessment and abandonments for injection/withdrawal gas storage wells to date across all fields. This is considerably ahead of the PHMSA requirement to complete baseline assessments within three to eight years. SoCalGas anticipates completing all fields by early 2020. Furthermore, for well integrity casing thickness demonstration for underground storage, SoCalGas goes beyond the DOGGR regulatory requirements by performing both magnetic flux leakage (“MFL”) and Ultrasonic Testing (“UT”) inspection technology to detect corrosion or metal loss, even though only one method is required.

SoCalGas has also developed and submitted a Risk Management Plan (“RMP”) to DOGGR for review and approval. The RMP includes, but is not limited to, the following: threat and risk assessment of each storage field, field specific emergency response plans that account for the threats and hazards identified in the RMP, a records management plan, a work plan and schedule for bringing wells into conformance with new well construction standards that require no single point of failure (providing seven years to bring all operating wells into compliance), or plugging and abandoning wells, prevention and mitigation protocols for monitoring and testing each well not yet in compliance, a schedule for verification and demonstration of mechanical integrity and testing protocols for storage wells, and various monitoring protocols.

iii. SoCalGas’ Corrosion Control and Failure Analysis Measures.

As part of SIMP, SoCalGas has also worked with industry experts to develop a Corrosion Control Manual within its RMP to optimize and inform corrosion control efforts. The Corrosion Control Manual includes the identification of well risks, corrosion rates and field specific trends, and mitigation measures, including cathodic protection. Through ongoing

assessments, SoCalGas is gathering and integrating data to evaluate potential threats to the production casing, including corrosion. In its continuing efforts to better understand and address corrosion, SoCalGas plans to work with DOGGR and industry experts to develop a corrosion control study. SoCalGas is also reviewing its internal failure investigation standard and is currently exploring whether it can enhance those standards.¹⁹

iv. SoCalGas' Well-Control Measures.

Both before the incident and continuing through today, SoCalGas has implemented numerous practices and procedures to enhance efficient and effective well control. Recently, SoCalGas enhanced its Emergency Response Plan to meet new federal and state regulatory requirements and prepositioned materials and executed new contracts to have certain materials and contractors available in the event of an incident. SoCalGas will work with DOGGR to further refine and strengthen its Emergency Response Plan. SoCalGas is also in the process of developing well-specific Inflow Performance Relationship (“IPR”) curves. SoCalGas notes that for decades the advanced lateral well-kill systems at its storage fields have provided remote connections to enter the wellheads for access to the tubing or annulus flow stream. SoCalGas also has surface emergency shut down systems on all injection and withdrawal wells, which include surface safety valves, a safety enhancement that is not standard nationwide.

v. Tubing Packer Completion-Dual Barrier System and Well Surveillance.

Consistent with current regulations, today all of SoCalGas' in-service gas storage wells have a tubing-packer completion, which provides two barriers, and gas injection and withdrawal is only done through the tubing. SoCalGas has also installed pressure transmitters on all storage wells at all fields. The pressure transmitters provide around-the-clock pressure monitoring of the tubing and annular spaces of a well.²⁰

vi. Surface Casings for New Wells Are Cemented to Surface.

As the Blade Report recognizes, DOGGR's Underground Gas Storage regulations require that operators cement surface casing to surface for new wells. SoCalGas has developed SIMP Chapters and Gas Standards to incorporate DOGGR Underground Gas Storage Regulations into its practices. SoCalGas submitted its RMP to DOGGR on April 1, 2019 and it is currently under review for approval by the Division.

¹⁹ As noted in the section above, SoCalGas disagrees with Blade's finding that SoCalGas did not investigate the causes of casing failures. SoCalGas further notes that for casing failures to be “formally investigated”—as recommended by Blade, destructive testing would likely be necessary. While Blade was able to extract and thoroughly examine the casing at well SS-25, it would be infeasible for SoCalGas to do perform the same level of failure analysis on active gas storage wells.

²⁰ SoCalGas began implementation of a Storage Safety Enhancement Plan or SSEP in March of 2017 that involved converting all wells at its storage fields to tubing flow only configuration, and that any well that could not be converted by April 1, 2017, would be temporarily plugged and filled with fluid. This work was delayed until November 2017 because the CPUC directed SoCalGas to revise its SSEP to maintain specific system-wide withdrawal capacities needed for reliability purposes.

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SoCalGas again emphasizes that this response provides SoCalGas' preliminary assessment of the Blade Report only and is not intended to provide a thorough evaluation of the Blade Report. SoCalGas anticipates more fully addressing the Blade Report after it evaluates the materials supporting Blade's findings, conclusions, and recommendations, and to the extent SED relies on the Blade Report in the OII. As Blade acknowledges, SoCalGas has undertaken significant safety enhancements to promote the continued safety of its gas storage facilities. Should you have any questions about SoCalGas' preliminary assessment of the Blade Report, or wish to discuss any other matters, please feel free to reach out to me directly.

Sincerely,

A handwritten signature in black ink, appearing to read "Jimmie Cho". The signature is fluid and cursive, with the first name "Jimmie" being more prominent than the last name "Cho".

Jimmie Cho
Chief Operating Officer