



**Annual Report Number 4**  
**Recommendations for Improvements Related to**  
**Safety and Leak Prevention**  
**July 2022 – June 2023**

**Report Date: July 31, 2023**

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## Overview

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SoCalGas (Defendant) and the State Attorney General, City Attorney for the City of Los Angeles, County Counsel for the County of Los Angeles, and the County of Los Angeles (collectively referred to as Government Plaintiffs) entered a Consent Decree to resolve claims raised by the Government Plaintiffs associated with the natural gas leak that occurred at the Aliso Canyon natural gas storage Facility (Facility) in October 2015. The terms and conditions of the Consent Decree required SoCalGas to, among other things, form an internal safety committee, and select and retain a third-party subsurface gas storage industry expert (Safety Ombudsman) who shall act as a safety advocate for the Facility. A copy of the Consent Decree may be accessed via this link: [Click Here](#)

Section 4.2 of the Consent Decree outlines the requirements for SoCalGas to establish a Well and Storage Operations Safety Committee (WSOC). The duties of the WSOC include but are not limited to the following:

- Meet quarterly to review safety issues at the Facility;
- Review operational safety issues and promote safe operations at the Facility consistent with applicable laws, rules, regulations, and orders;
- Review Facility-related information, materials, or work product to assess safety at the Facility;
- Make recommendations to SoCalGas for repairs, improvements, policies, and/or upgrades to the Facility or infrastructure therein;
- Facilitate the role of, and work in cooperation with, the Safety Ombudsman;
- In coordination with the Safety Ombudsman, conduct periodic safety audits or safety-related Strengths, Weaknesses, Opportunities, Threats (“SWOT”) analyses of the Facility; and
- Review California Public Utility Commission (CPUC) and California Department of Conservation Geologic Energy Management Division (CalGEM) audit reports of the Facility.

Section 4.3 of the Consent Decree outlines the requirements for SoCalGas to select and retain a Safety Ombudsman and the duties associated with that role. The duties of the Safety Ombudsman include the following:

- Participate in all Well and Storage Operations Safety Committee (WSOC) meetings;
- Have access to all non-privileged materials, information, records, and work product in SoCalGas’ possession, custody, and control necessary to accomplish the tasks required of the Safety Ombudsman;
- Review CPUC and CalGEM audit reports of the Facility;
- Review and evaluate all incidents reported to the public and State and local agencies pursuant to Section 4.1 of the Consent Decree;
- Review and advise on the WSOC’s efforts, findings, and recommendations for improvements;
- Serve as a non-exclusive repository for safety-related concerns reported by the public with respect to the Facility;
- Serve as a point of contact to receive safety complaints or concerns relating to the Facility from anyone who wishes to remain anonymous, and provide any anonymous reports of safety concerns to SoCalGas;

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- Maintain the privacy of the person or member of the public confidentially making safety complaints or concerns relating to the Facility;
- Generate annual reports (Annual Reports) that detail the following:
  - The work of the Safety Ombudsman;
  - The work of the WSOC; and
  - Recommendations, if any, for improvements related to safety and prevention of leaks at the Facility.
- Provide the Annual Reports to the Attorney General, the City Attorney, County Counsel, the CPUC and CalGEM. The Annual Reports shall also be made public via the Aliso Canyon Website and the local community shall be provided with an opportunity to comment on the Annual Reports. The Safety Ombudsman shall schedule at least one public meeting each year to explain and respond to questions regarding the Annual Reports.

This report has been prepared in accordance with the requirements outlined in Section 4.3, (b), (ix), (2) of the Consent Decree, and summarizes the recommendations for improvement made by the WSOC and/or the Safety Ombudsman during the period of July 2022 – June 2023. It is the fourth such annual report. [Section I](#) of this report summarizes recommendations developed by the WSOC. [Section II](#) includes recommendations of the Safety Ombudsman.

The Safety Ombudsman maintains a compendium of all recommendation topics by the WSOC and/or the Ombudsman over the past four years during which the Consent Decree has been active. This report provides a summary of the new recommendations as well as the status of prior recommendations. The summary of past and current recommendations and the progress of SoCalGas in response to the recommendations is contained in a Microsoft Excel file which can be found at the following link: [Click Here](#)



## I. Recommendations of the WSOC for Safety Improvements at the Facility

Following a procedure audit and at the end of the 2021-2022 WSOC meeting cycle, the audit subcommittee made eight (8) recommendations for improvements to Gas Standard 224.106 Casing and Tubing Inspection Field Procedures (published on March 28, 2019). The recommendations and SoCalGas response are provided below:

1. Review requirements in gas standard to confirm all data is being recorded correctly on the well logging procedure form (former casing inspection logging procedure (CILP) form).
  - a. SoCalGas response: Agree SoCalGas has updated its software (K2) to contain data for each well workover.
2. (Ultrasonic inspection tool (USIT) logs) Develop process to verify required steps are completed and information is included on reports. Develop process to confirm required repeat passes are performed at the correct locations, length and resolution.
  - a. SoCalGas response: In conjunction with the vendor, a process is now being used to determine the high-resolution repeat intervals. The logging requirement will be forty (40) feet below and twenty-five (25) feet above each target feature. The specified logging has been included in the casing and tubing inspection field procedure gas standard. Additionally, the updated requirements, as expressed in the gas standard, have been communicated to the logging vendors.
3. (Magnetic Flux Leakage (MFL) tool) Require the MFL vendor to add logging speed and tool resolution directly to the MFL Log Report. Add a requirement to the gas standard requiring the MFL vendor to add average and maximum logging speed information to the MFL report(s).
  - a. SoCalGas response: SoCalGas' vendor has added Logging Speed and Tool Resolution to the remarks section of the MFL reports.
4. (Noise/Temp logs) Require the Noise/Temperature vendor to include noise functionality checks on the final Noise/Temperature report and/or update gas standard as needed.
  - a. SoCalGas response: Files noted in the audit findings were updated and reprinted, adding noise functionality checks. SoCalGas will require the vendor to include noise functionality checks on the final Noise/Temperature report. SoCalGas is working with its Noise/Temperature vendors to include noise functionality check on the final N/T reports.
5. (Gamma-ray/neutron and casing collar locator logs (GRN/CCL)) Require the USIT vendor to specify the required Accelerometer EEPROM calibration frequencies in the cement bond log (CBL) and/or Compensated Neutron Log reports. Require the USIT vendor to update Accelerometer EEPROM calibration dates and/or verify that they are within the tools' specified tolerance.
  - a. SoCalGas response: High-Resolution Integrated Logging Tool Gamma Ray and Neutron Sonde (HGNS) calibrations met tolerances. However, the frequencies of calibrations were not available as the HGNS tools were used for correlation purposes, only to tie into the original open hole logs and provide depth control for the USIT Logs. SoCalGas' vendor updates



- calibrations every six (6) months and neutron calibrations within six (6) months are also included in the log.
6. (Third-Party Tubing Inspection) Instruct inspection vendor(s) to include quantitative inspection data for every joint or revise gas standard. Add verbiage to the inspection reports that specifically states that all defects listed in #2 & #3 above are screened. Specify the name of the well receiving the tubing joints and other pertinent information.
    - a. SoCalGas response: Going forward, reports will contain the well name if the used pipe is deemed appropriate for inspection (pipe from well meets UGS standards, connections, and traceability documentation). For wells that received new tubing, the corresponding inspection report is related to the initial inspection for purchased pipe. The pipe information is allocated with the Miscellaneous Request Orders (MRO). SoCalGas is following this process and its reports include the identified items.
  7. (Pressure tests for mechanical integrity) Develop process to review test results to determine a successful test.
    - a. SoCalGas response: SoCalGas notes that there is a current process which requires CalGEM approval. Model Uncertainty for measurements between 0-3,000 psig is +/- 0.1% of span. The 0.02% is lower than the uncertainty of 0.1%. Please refer to calibration page. Also, the minimum measurement of the Crystal Gauge is 1 psi. At 1136 psi, 1 psi represents 0.09%, greater than the 0.02% calculated change. In other words, precision greater than 0.09% cannot be achieved. SoCalGas follows the previously described process.
  8. (Response criteria) Add a “reviewed by” section to the Inspection Report-Well Integrity. Create a Tubing Inspection Analysis report and document findings and corrective actions.
    - a. SoCalGas response: The Senior Storage Field Engineer who oversees all well logging sends an email, which includes the Burst Calculation results, to the respective responsible Engineer. The Project Manager will request the Well Site Manager (WSM) to upload email results into WellView. Regarding tubing, the Project Manager will request confirmation from SIMP Assessment Storage Field Engineer and request the WSM to upload the email to WellView. The inspection reports are reviewed and approved by the SIMP Assessment Team, then uploaded into the Records Document Management System (system of record; RDMS).

The WSOC made the following recommendations or enacted improvements during the July 2022-June 2023 period.

1. At the September 2022 WSOC meeting, the International Standards Organization (ISO) 16530 Well Integrity: Life Cycle Governance was discussed at the September 2022 WSOC meeting, pursuant to a prior recommendation from the Safety Ombudsman to review ISO 16530 and consider adopting relevant portions of the standard. SoCalGas compared ISO 16530 and current practices already adopted in response to PHMSA regulation/API 1171 and CalGEM regulation, and decided to pursue the following improvements:
  - a. Creation of generic wellbore diagrams that fit different well construction types and which specifically highlight the primary and secondary barriers;



- b. Compilation of performance standards for well barrier elements into a table with barrier description, monitoring requirements, and acceptance criteria; and
  - c. Review of annulus pressure thresholds for tubing/casing annulus; enhancement, where appropriate, of the documented rationale for choosing the threshold limits in the procedure; and enhancement of the procedure to reflect the monitoring and trending steps taken prior to pressures reaching threshold limits.
2. At the June 2023 meeting, the WSOC chair noted two recent improvements related to facility wells:
    - a. Regarding well head valves material verification best practices, a new form was developed and implemented which includes sign-offs with the vendor at the vendor's shop and on-site when delivery is received at the storage field.
    - b. To reduce pressure anomalies caused by faulty surface equipment, the casing production laterals are being removed and the kill side of the casing is being disconnected from the network. Redesign will keep remote stab connections available for emergency response. Additionally, the casing will be pressurized to 450 psig using nitrogen instead of natural gas. This work will occur following SIMP inspections rather than as a one-time project, making this a multi-year process to complete.
  3. At the September 2022 meeting, the WSOC approved an audit for Section 5 of SoCalGas Gas Standard (GS) 224.119 Pressure Monitoring-Storage Wells and Reservoirs. Upon WSOC request, the Safety Ombudsman randomly selected ten wells to be included in the audit. The audit team reviewed pressure transmitter data verification and pressure differences between calibrated electronic gauge and transmitter (>10 psig for tubing, casing, annulus 1 and annulus 2) for the period January 1, 2021 through June 30, 2022. Observations of employees conducting work in the field to validate employees are following procedures as written was completed on March 10, 2023. Recommendations made by the audit subcommittee were:
    - a. Review Gas Standard 224.119 Pressure Monitoring – Storage Wells and Reservoirs and Maximo Job Plan # ACWPTCHK with applicable employees.
    - b. Additional training for employees focusing on Section 5.5 of gas standard: If pressure difference is greater than 10 psig, then the Operator shall do the following:
      - i. Verify instrument tubing is free from restrictions.
      - ii. Clear trapped gas or liquid pressure by depressing the quick connect and then zero the calibrated electronic gauge and recheck the pressure read using the electronic gauge.
      - iii. If the differential is still higher than 10 psig, the Operator shall do the following: Issue Work Order to the maintenance department to replace or repair the transmitter.
    - c. Use Aliso Daily Pressure form to document pressure reading while in the field.
      - i. Use this form as reference to enter the pressure reading into the Monitoring database once back in the office.
      - ii. Include notes to Monitoring database if rig is on site or any deviations.
      - iii. Scan and upload a copy of the completed form attaching it to the completed work order in Maximo.
      - iv. Assign a responsible person to keep form up to date.



- d. Edit the Maximo Job Plan:
  - i. Move reference to verifying crystal gauge calibration to beginning of job plan steps.
  - ii. Update/change reference from “Control Room” to “Operations Office.”
  - iii. Move step # 50 to end of job plan.
  - iv. Add new step #55 “If there is a new transmitter in the field but no Pi tag listed on the Aliso Daily Pressure form notify Operations supervisor.”

A presentation summarizing the audit of GS 224.119 can be found at the following link: [Click Here](#)

- SoCalGas Response:
  - SoCalGas has reviewed and agrees with the WSOC recommendations related to Gas Standard 224.119 Pressure Monitoring Storage Wells and Reservoirs. SoCalGas is in the process of implementing the recommendations. GS 224.119 Pressure Monitoring - Storage Wells and Reservoirs has been updated and addresses recommendations from the Safety Ombudsman:
  - Pressure and Methane monitoring data is visually displayed in the operations room allowing for integration of data visually. Both pressure and methane monitoring systems have alerts that allow for anomalies identified on a given well to be further investigated.
  - There is continuous pressure and methane monitoring. Operators within the operations room monitor the display screens multiple times in a shift and respond to alerts as needed.
  - When anomalous conditions are observed, corrective work-orders are created and the anomalous condition is investigated.

## II. Recommendations of the Safety Ombudsman for Safety Improvements at the Facility

### **Part A: Recommendations Made During the July 2022 – June 2023 Period**

The Safety Ombudsman developed the recommendations listed below during the July 2022 – June 2023 period for consideration of the WSOC.

1. The Ombudsman recommended improvements in the well handover process, which SoCalGas embeds in STOR-002 O&M Request Work Instructions:
  - a. Develop and adapt a form specifically titled “well handover” or “well turnover,” using information outlined in ISO 16530 to form checklists and role/responsibility sign-off and review.
  - b. Retain the form in well records.
  - c. Use when control of well site is being turned over from Operations to Downhole Well Workover Supervisor and when control of the site is being turned back to Operations from the Downhole Well Workover Supervisor.
  - d. Could be used when well sites are being handed over/returned from/to Operations by other parties as applicable.
  - e. STOR-002 does not specifically contain a checklist to verify technical and safety conditions when the well site is handed over and returned – liken this handover and return to a PSSR





- (pre-startup safety review) and part of temporary decommissioning and recommissioning when a well is turned over from operating status to intervention status.
- f. Refer to ISO 16530-1 (2015) Section 7.8.1 and Annex R and to ISO 16530-2 (2015) Section 14 and Annex M.
  - g. Benefits include more specific safety review (beyond the effect of STOR-002 creating a good communication chain).
  - h. Detail inside the handover/return form should include personal accountabilities (signatures of the individuals responsible for turnover, acceptance, return, as well as supervisory review).
- SoCalGas Response: SoCalGas continues to review and implement elements of ISO 16530 as appropriate, as well as revise and update STOR-002. STOR-002 UGS O&M Request Work Instructions is a System Instruction document, with the purpose as follows: “This local system instruction document provides guidelines for requesting Storage Operations and Maintenance (O&M) support to prepare for well drilling, well workovers, coiled tubing, wireline, servicing, testing and commissioning activities.”
2. Pursuant to Data Requests #15 and #15A regarding the fence-line methane monitoring system, the Ombudsman recommends tracking the reliability of safety systems:
    - a. The fence-line methane monitoring system daily percent availability and reliability should be tracked (where “reliability” and “availability” are defined as in SoCalGas response to DR #15 Q1). Tracking should include for those instances of non-availability or non-reliability the causal factor, including from among possible causal factors 1) maintenance, 2) repair, 3) humidity, 4) beam block, 5) other issue as identified, 6) unknown.
    - b. SoCalGas should verify tracking of the percentage of time a monitoring station was considered to be “on and reporting” with the information available via the weblink, the percentage of time a monitoring station was off for routine planned/scheduled repair and/or maintenance, the percentage of time a monitoring station was off for non-routine or corrective (unplanned) repair and/or maintenance, and the percentage of time a monitoring station was off and/or not reporting and awaiting investigation as to the cause of the status.
    - c. The concept of reliability tracking can be extended to other safety systems, such as well safety valve reliability, including failed closures on demand or on test, failures in control systems, and false closures. Well pressure and flow and annulus pressure monitoring equipment accuracy and reliability also could be tracked.
  - SoCalGas response:
    - SoCalGas continuously monitors the Fenceline methane monitoring system and by virtue of the continuous monitoring system, tracks the availability of the system. SoCalGas has not identified a recurring problem with the reliability of the system. SoCalGas has not determined a need to track reliability or to establish a reliability metric.
    - Well safety valves are inspected and tested semi-annually during which any testing exceptions are recorded. Please note, the design of the valve will automatically fail close.
    - Well Pressure, annulus pressure monitoring equipment (transmitters) are checked on a weekly basis during which fidelity is already being tracked. Additional tracking for reliability is being evaluated for inclusion in system records.



3. At the December 2022 WSOC meeting, the Ombudsman reviewed the responsibilities of the committee per the charter and recommended that in the 2023-2024 WSOC cycle, a strengths-weaknesses-opportunities-threats (SWOT) exercise should be conducted, to be facilitated by the Ombudsman over the course of the 2023-2024 WSOC meetings. The SWOT boundaries would be defined to include the SIMP and its related technical-human-organizational-fundamental hazards and barriers. The purpose of the SWOT would be to elicit WSOC recommendations for safety improvement at the facility.
  - SoCalGas Response: During the September 2022 meeting, the sub-committee presented four (4) options for the WSOC to consider. The four (4) options included two (2) audits and two (2) SWOT analyses. The WSOC selected an audit from the options and noted that it could utilize one of the remaining options for the next audit/SWOT analysis.
4. At the December 2022 WSOC meeting, the Ombudsman also recommended that:
  - a. The WSOC should work with the SoCalGas Safety Culture Improvement Plan to allow the SIMP to be one organizational area of focus and leverage the strengths of the SIMP.
    - i. SoCalGas response: At the March 2023 meeting, the lead for the Safety Culture Improvement Plan made a presentation and had discussion of the Plan with the WSOC.
  - b. Each WSOC meeting begin with a risk-based safety topic presented by WSOC members.
    - i. SoCalGas response: The addition to the WSOC agenda was initiated at the March 2023 meeting. SoCalGas has incorporated a safety moment during the quarterly WSOC meetings, including reviewing industry lessons learned. In addition, SoCalGas reviews NTSB and PHMSA incident and investigatory reports related to storage.
  - c. Review PHMSA incident reports and NTSB and/or CSB investigation reports on major accidents related to storage, such as the Pryor Trust well fire ([Click Here](#)) and Wendland 1H (report due in late 2023 [Here](#)), or other incidents. PHMSA incident reports are available [Here](#) and other PHMSA incidents classification and trends which are available [Here](#), [Here](#), and [Here](#). WSOC members also consider the option to read additional risk-based process safety materials, such as “Failure to Learn,” by Andrew Hopkins.

At the June 2023 WSOC meeting the Ombudsman provided the WSOC with a review of 2017-May 2023 PHMSA incident reports involving gas storage, noting seventeen (17) of seventy-six (76) storage-related incidents reported during that period involved wells, including ten (10) well leaks and seven (7) well workover incidents. Review of incidents helps to focus gas storage operators on questions such as:

- Where do we have control and can take preventative measures?
- Which incidents can we anticipate and prepare mitigation?
- How do we address the importance of “Human error” as an underlying cause, especially when fourteen (14) of the last twenty-one (21) storage-related incidents reported to PHMSA can be interpreted to have underlying causes rooted in human and organizational factors – such as “incorrect” or “inadequate” something, or “failure to” perform something as intended, or “faulty” interpretations, designs, maintenance programs and practices, inspection types-methods-tools, supervision-ownership-decision making, or incorporation of wider learning and historical knowledge?



- The Ombudsman recommended that in future cycles the WSOC perform an annual review of the PHMSA incident report database for storage-related incidents, as well as incident investigations related to major accidents on wells, such as those from the National Transportation Safety Board (NTSB) or the Chemical Safety Board (CSB), since there could be lessons learned from other operators' incidents that could have bearing on the continual learning and improvement at the Aliso Canyon facility.
- i. SoCalGas Response: SoCalGas has incorporated a safety moment during the quarterly WSOC meetings, including reviewing industry lessons learned. In addition, SoCalGas reviews NTSB and PHMSA incident and investigatory reports related to storage.
5. The Ombudsman recommends that SoCalGas' risk reduction at the Aliso Canyon facility since 2016 be documented, including the knowledge gained through ongoing monitoring, the preventive and mitigation (P&M) efforts employed or planned, and the perceived efficacy and effectiveness of those P&M measures. Risk reduction could be itemized for each of the following categories and subcategories:
- a. Reduction in footprint (number of active wells and well sites)
    - i. General reduction in environmental and safety impact potential
    - ii. Reduced reservoir pressure and volume (reduces consequence potential)
  - b. Increased mechanical integrity and resilience of wells
    - i. Design / materials improvements (liners, other tubulars, cement, wellhead)
    - ii. Two passive physical/technical barriers (tubulars)
    - iii. Additional wellhead barriers
    - iv. Treatment for prevention/mitigation of other hazards;
    - v. Plugged well integrity
  - c. Increased human and organizational awareness and discipline
    - i. High-quality procedural and engineering/material standards
    - ii. Remote/electronic/continuous monitoring, with alarm/warning management
    - iii. Additional downhole and wellhead testing, inspection, analysis
    - iv. WSOC and other aspects related to safety management
    - v. SIMP organizational acumen
- SoCalGas Response: SoCalGas appreciates the example metrics provided by the Safety Ombudsman. As aspects of the SIMP program develop, SoCalGas will look for opportunities to update the metrics to enhance the ability to evaluate program performance. SoCalGas has developed a framework and approach to managing the integrity of underground storage assets in its SIMP plan, including processes for data collection and integration, threat evaluation and risk assessment, integrity assessment, and implementation of prevention and mitigation protocols. The processes described and referenced in the SIMP plan detail the mitigations implemented to reduce the risk of a well or reservoir failure. SoCalGas has developed and is executing a quantitative risk assessment for storage wells. The risk assessment framework will allow for various mitigation scenarios to be evaluated, demonstrating the risk benefit of certain implemented or proposed P&M measures.



## **Part B: Report on SoCalGas Progress in Responding to Recommendations Made in Prior Periods**

### **Part B-1**

The following recommendations made by the WSOC are closed:

1. Develop a Company Gas Standard outlining the process for taking wells out of service/returning wells to service.
2. Review and address the PHMSA audit letter dated May 28, 2020 prior to the next scheduled PHMSA audit of Aliso Canyon.
3. Improvements recommended to Gas Standard 224.106 Casing and Tubing Inspection Field Procedures

### **Part B-2**

The following recommendations made by the Safety Ombudsman are closed, with SoCalGas responses briefly summarized below:

1. The Ombudsman made thirty-two (32) recommendations for improving the SIMP in 2020. SoCalGas reviewed each recommendation and provided the Ombudsman with a response and most recommendations were included in the revised RMP-SIMP submitted to CalGEM on April 1, 2023.
2. In October 2020, the Ombudsman recommended that SoCalGas develop and implement procedures for analysis of apparent corrosion rate and corrosion defect characterization to facilitate identification of wells requiring immediate action to address potential integrity issues which could pose a threat to the safety of the Facility. SoCalGas retained a third-party expert to complete a corrosion study of SoCalGas' storage wells, including developing a methodology for calculating corrosion rates of well casings, consideration of inspection tool defect sizing accuracy and reporting thresholds for both MFL and UT casing inspection platforms, and direct examination of portions of casing which have been removed from wells to aid in validation of the inspection tool results/accuracy.

SoCalGas implemented procedures for analysis of apparent corrosion rate and corrosion defect characterization in Gas Standard 224.125 Well Casing Anomaly Matching which was published to the Document Library. The stated purpose reads as follows:

“The purpose of this standard is to describe the process of estimating corrosion growth rate from well casing inspections.”

This Gas Standard is periodically reviewed and updated as these procedures continue to evolve as inspections are completed.

At the Aliso Canyon facility, wells have been plugged in accordance with CalGEM and PHMSA rules, essentially filling all voids with cement, and reducing the well count to sixty (60) injection/withdrawal (I/W) wells. Forty-one (41) out of sixty (60) I/W wells have had complete new inner casing strings installed since 2016, and by the end of 2023 the plan is that forty-four (44) wells, 73% of the I/W wells, will have new inner casing strings.



All wells have had 2<sup>nd</sup>-round assessments, which includes casing inspection logs; thirty-two (32) wells have had 3<sup>rd</sup>-round reassessments with an additional 3 are in progress; and two (2) wells have had 4<sup>th</sup>-round reassessments with one (1) in progress.

In calendar year 2022, seventeen (17) wells had integrity reassessments. As of the June 2023 WSOC meeting, the 2023 year-to-date work on Aliso Canyon wells included three (3) integrity reassessments completed and five (5) in progress; two (2) well plug and abandonments completed; and two (2) new inner casing strings installed with one (1) in progress.

CalGEM's Underground Gas Storage Regulations state, under Section 1726.6(a)(2), "The Division may approve a less frequent casing wall thickness inspection schedule for a well if the operator demonstrates that the well's corrosion rate is low enough that biennial inspection is not necessary."

The ongoing accumulation of well integrity findings from the surface monitoring and downhole inspections provides increased knowledge of site-specific, time-dependent mechanisms of degradation, such as internal and external corrosion.. The findings of the reassessments suggest to SoCalGas that the reassessment inspection period can be lengthened, and the Company has submitted individual requests to CalGEM for such reassessment extensions for forty-six (46) wells at the Aliso Canyon facility. As of the June 9, 2023 WSOC meeting, SoCalGas had received permission from CalGEM to extend the reassessment interval from twenty-four (24) months to 50-60 months on twenty-nine (29) wells, all of which have had new inner strings of casing installed and cemented in place since the initial baseline inspections. CalGEM's decision is pending on an additional eleven (11) wells, while CalGEM has denied extension of reassessment intervals for six (6) wells.

The reduced frequency of well workovers, coupled with the knowledge gained with respect to degradation rates, can lower the overall risk profile of the Facility without compromising public and employee safety.

3. The Ombudsman recommended in Q4 2020 that SoCalGas initiate an investigation of possible subsurface accumulation(s) of gas behind well casing in the area surrounding the SS-25 well, including baseline and subsequent gas detection logs. This investigation could be accomplished as part of California's Requirements for Underground Gas Storage Projects – specifically Section 1726.7.e, which mandates that operators develop a program to conduct baseline and subsequent gas detection logs on each gas storage well to detect gas behind casing. An investigation may reveal whether residual gas associated with the SS-25 leak exists at depth, and if so, enable accurate mapping of the gas. This, in turn, may aid SoCalGas, CalGEM, and the CPUC in assessment of the risk associated with remnant gas accumulations, and whether a recovery plan is feasible and advisable.

SoCalGas has collected field screening data at various monitoring locations on and around the SS-25 well pad since the well was plugged in February 2016. A leak survey report that analyzed data from nested soil vapor probes from April to December 2016 found that significant reductions in methane concentrations had been observed in the subsurface. Data also indicated that natural degradation processes had assisted in bulk methane reduction, and at some locations had allowed complete attenuation prior to reaching the surface. Additional monitoring performed through August 2018 using nested soil vapor probes found no detectable methane.



Separately, per the requirements of CalGEM regulation 14 CCR §1726.7(e), SoCalGas is developing a program to “conduct baseline and subsequent gas detection logs on each storage well to detect gas indications behind casing.” Gas detection logs have been run on all gas storage wells. Further program definition will be added around types of tools to utilize, frequency of logging, and comparison of subsequent logs to each other and to the baseline.

4. SoCalGas conducts a community meeting annually with residents and other parties to address questions related to the Aliso Canyon Facility – the Aliso Canyon Community Meeting. The Safety Ombudsman should be included in the notice of this meeting and be afforded the opportunity to join the meeting. Participation by the Safety Ombudsman will facilitate transparency and may serve to aid in addressing questions of a broader nature concerning how safety and well integrity are addressed by the storage industry at large.

SoCalGas will notify the Safety Ombudsman of the annual Aliso Canyon Community Meeting so that the Safety Ombudsman has the opportunity to attend.

5. The WSOC issues minutes from each quarterly meeting with the Safety Ombudsman. Typically, the minutes have not been distributed until the next scheduled quarterly meeting. The Safety Ombudsman previously requested that the minutes be issued within a reasonable time after each quarterly meeting as opposed to waiting until the next meeting. Also, the Safety Ombudsman should have an opportunity to review and comment on the draft meeting minutes prior to formal approval by the voting members of the WSOC.

The WSOC meeting minutes have been distributed within a reasonable time after each quarterly meeting during the July 2022 – June 2023 period.

6. In mid-late 2019 and through 2020, the Safety Ombudsman recommended that SoCalGas review and evaluate adaptation of relevant practices contained in ISO Standard 16530 (Petroleum and Natural Gas Industries – Well Integrity) such as Well Barriers, Well Monitoring and Surveillance, Annulus Pressure Management, and Well Intervention. SoCalGas completed its review and presented its recommended adaptations at the September 2022 WSOC meeting – refer to [Section I](#) for the specific actions. SoCalGas is working to determine the ability to document and highlight well barriers within WellView. In addition, the Company pressure monitoring gas standard 224.119 has been updated to more clearly document the justification for the tubing-casing annulus pressure upper threshold.

### **Part B-3**

The following recommendations made by the Safety Ombudsman are open, with SoCalGas responses briefly summarized below:

1. The Safety Ombudsman made the following recommendations in **July 2022** to increase the adequacy and effectiveness of Gas Inventory Analysis and resolve year-to-year discrepancies and/or inconsistencies:
  - a. Apply consistent methodology for calculating average reservoir pressure in the inventory verification process and consistent with Gas Standard GS 224.070 Reservoir Integrity and Inventory Assessment;



- b. The report format should be consistent from year to year, and the report should discuss elements influencing average reservoir pressure calculations, such as any operational changes, changes to the estimate of gas dissolved in the oil phase, influence from the aquifer, and any other aspects that affect the analysis;
  - c. Changes to the average reservoir pressure evaluation method should be updated in the relevant Gas Standard, GS 224.070 Reservoir Integrity and Inventory Assessment, assuming that has not been completed;
  - d. The change in the July 5, 2018, weighted average reservoir pressure, P/Z, and Z factor reported in the 2018 report versus what is reported in the 2020 version needs to be explained, including all assumptions made in arriving at the revised figure in the 2020 report;
  - e. SoCalGas should retain a third-party independent reservoir engineering expert with expertise in gas storage operations to perform an annual independent review of the results of its inventory verification analysis of Aliso Canyon; and
  - f. Include in the inventory assessment an address of fuel, use, and fugitive loss and how these are accounted for in the inventory verification process.
- SoCalGas Response: SoCalGas is in the process of retaining the services of a third party to review the gas inventory analysis and provide further recommendations. SoCalGas reviewed recommendations a. through f. above and responded as follows, in order:
    - The methodology for calculating reservoir pressure is consistent across the storage fields, and, where differences exist, they are pointed at in GS 224.070 (Section 4.3.4.1.1). SoCalGas plans to develop field-specific appendices, providing greater granularity on the changes in the well population used for the calculation over time.
    - SoCalGas plans to develop a more comprehensive annual report on inventory verification addressing the items identified in the recommendations.
    - See SoCalGas' response to a. above.
    - This recommendation refers to an inadvertent typo in the 2020 report, which has been fixed.
    - This recommendation is already implemented and detailed in GS 224.070, Section as the "Validation" step of the Inventory Assessment Process Workflow. As discussed with the Safety Ombudsman, a 3-to-5-year independent review may be more appropriate.
    - SoCalGas plans to include a section in the proposed comprehensive annual report which reviews the data obtained from the Measurement Group regarding fuel usage and fugitive losses.

Status: Certain items remain Open, as noted in the SoCalGas response, and the progress to completion will be monitored through quarterly WSOC meetings in the July 2023 – June 2024 period.

2. Through mid-late 2019 and 2020, the Ombudsman made an ongoing recommendation that SoCalGas periodically review its human and organizational capacity and effectiveness with respect to the SIMP, identify potential gaps in technical expertise, include supervisory protocols to ensure adequate oversight for both company and contractor personnel, assess the adequacy and



competence of resources to meet the needs of the organization, and verify that those engaged in SIMP activities are trained in and aware of the associated regulatory compliance requirements.

- SoCalGas Response: Thus far SoCalGas has added detail to Section 7.2.1 of SIMP.8 Quality Assurance Plan to describe the status of the Human Factors Assessment. The description in SIMP.8 is supplemented in the updated April 1, 2023 RMP with Appendix D: Human Factors Assessment Overview. During the Q1 WSOC meeting, held on March 23, 2023, SoCalGas provided an overview of the Safety Forward program to WSOC. Safety Forward is a company-wide commitment to enhance SoCalGas' safety culture while living its safety values. Under the SIMP, the Internal Audit and Human Factors Assessment programs provide structures for detailed procedural reviews, including observations of field execution, to understand the appropriateness and effectiveness of SIMP processes. They also allow for an understanding of how the systems in place support personnel in their comprehension of procedural requirements and execution of tasks. The employee training program in place includes awareness training of procedures pertinent to an individual's job responsibilities. The contractor onboarding process supports the effort to bring trained and qualified individuals to job sites.

Status: While in part this original 2019-2020 recommendation is closed, it is an ongoing recommendation to which the new Ombudsman added similar specific recommendations as noted in [Part A](#) of this Section, and thus the study of human and organizational factors and reliability remains an open recommendation, subject to periodic evaluation of the Company's continual improvement.

3. Risk metrics 3/23/22 - Develop performance metrics with respect to:
  - a. Procedural robustness, adequacy, and continual improvement;
  - b. Risk management effectiveness through:
    - i. Metrics regarding risk management activities (prevention, mitigation, planning, analysis, plan implementation);
    - ii. Metrics regarding risk reduction and whether it occurs with respect to some or all of prevention, mitigation, knowledge gap closure, or other aspects of risk; and
    - iii. Metrics regarding risk decisions executed and effects monitored.
  - c. Safety culture improvements, including those with respect to human and organizational risk management.
- SoCalGas response: SoCalGas appreciates the example metrics provided by the Safety Ombudsman. As aspects of the SIMP program develop, SoCalGas will look for opportunities to update the QAP metrics to enhance the ability to evaluate program performance. As we continue to analyze monitoring and assessment data, and as quantitative risk assessments are conducted on storage wells, will enhance SoCalGas' ability to better determine appropriate and meaningful performance metrics.
4. Plan for reservoir integrity risk assessment
  - SoCalGas response: Efforts are ongoing to develop a framework for managing reservoir integrity and risk, including development of new, or implementing enhancements to existing, processes and procedures. SoCalGas engages in several activities to monitor reservoir integrity, such as semi-annual inventory shut-ins. SoCalGas has also developed GS 224.132 – Reservoir Integrity





Assessment and continues to work on integration of data from various monitoring activities. In addition, SoCalGas has conducted a Reservoir and Caprock Threat Workshop and continues to build on that effort.