



Annual Report Number 2
Recommendations for Improvements Related to
Safety and Leak Prevention
July 2020 – June 2021

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Overview

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 into 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’s 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;
- Maintain the confidentiality of the person or member of the public making any confidentially made 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), (3) of the Consent Decree, and summarizes separately recommendations for improvements related to safety and leak prevention developed by the WSOC, and those developed by the Safety Ombudsman during the period of July 2020 – June 2021. It is the second such annual report. [Section I](#) of this report summarizes recommendations developed by the WSOC. [Section II](#) includes recommendations of the Safety Ombudsman.



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

In June 2020 the WSOC developed the following recommendations for safety improvement at the Facility:

1. The development of a Company Gas Standard outlining the process for taking wells out of service/returning wells to service; and
2. The WSOC recommends that SoCalGas review and address the PHMSA audit letter dated May 28, 2020, prior to the next scheduled PHMSA audit of Aliso Canyon.

Both recommendations were addressed and implemented by SoCalGas in October 2020.

No additional recommendations for safety improvements were made by the WSOC during the period covered by this report.

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

The Safety Ombudsman developed the five (5) recommendations listed below for consideration of the WSOC/SoCalGas.

1. In March, a sub-committee of the WSOC initiated an audit of Gas Standard 224.106, Casing and Tubing Inspection Field Procedure. The sub-committee's plan was to complete the audit and report on its findings by the June 2021 WSOC Quarterly Meeting. As of the date of this report, the sub-committee has not yet completed the audit. Once the sub-committee issues its report and any recommendations for follow-up, the WSOC should develop an action plan and timeline for addressing any compliance gaps and/or deficiencies identified during the audit. The action plan should include recommendations for revising the standard itself to the extent that revisions are warranted. The action plan should also include recommended steps to be taken to address compliance gaps/deficiencies, specific measures which may be tracked and reported, and a closure report documenting the actions taken, accountable individual(s), the target date of completion, and actual date of completion. The sub-committee's report should be shared with the Safety Ombudsman and the Safety Ombudsman afforded the opportunity to comment/provide input to the report. Also, the WSOC's action plan and associated work product should be discussed with the Safety Ombudsman for comment/feedback prior to implementation.
2. In response to Data Request No. 8, Questions 1 and 4, SoCalGas indicated they have retained a third-party expert to complete a corrosion study of SoCalGas' storage wells. Part of this effort includes 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.

The Safety Ombudsman endorses this plan and recommends the initiative be given high priority. A review of the casing inspection results that were supplied in SoCalGas' response to Data Request No. 5, Question 1 and Data Request No. 8, Question 3 provide evidence that corrosion rates in most wells are moderate to low. This is evident in reviewing the calculated remaining life for wells



which have undergone two or more casing inspections. Low corrosion rates suggest that the current integrity inspection frequency of every 24 months could be scaled back, in many cases, to a lower frequency without compromising well integrity and safety.

Every Aliso Canyon well is completed with tubing set on a packer. Inspection of the tubing and casing to assess well integrity requires a workover, which involves killing the well to remove the tubing and inspect it as well as the casing. The nature of this work increases the overall risk profile of the Facility – well workover activities are inherently riskier than normal injection/withdrawal operations. Thus, prudent operations dictate that this risk be balanced against the risk associated with the likelihood of downhole corrosion and the attendant impacts to well integrity. Where corrosion rates are low, the running of casing inspection logs on a less frequent basis would appear justified and could reduce the overall risk profile of the Facility due to fewer well intrusions.

SoCalGas should make every effort to accelerate the work of the third-party charged with performing the corrosion study referenced in response to Data Request No. 8. Doing so may provide compelling evidence that the observed corrosion rate(s) in SoCalGas' storage wells does not warrant the running of casing inspection logs every 24 months. If so, this would reduce the frequency of well workovers and lower the overall risk profile of the Facility without compromising public and employee safety. CalGEM's Underground Gas Storage Regulations provide for this type of condition-based monitoring 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."

3. As part of Data Requests Numbers 1 and 8, SoCalGas provided a copy of the 2018 and 2020 Inventory Verification Reports. The Conclusion section of the 2018 report identified what was described as a "deviation from the 2005-2016 P/Z versus Inventory behavior of Aliso Canyon." The deviation from the long-term pressure-inventory trend line ranged from 6-9 Bcf depending on the wells/method used to calculate the weighted average reservoir pressure. The deviation was attributed to "reservoir and operational factors as well as qualitative overestimation of the reservoir pressure." Lastly, the 2018 report indicated that "additional analysis and work need to be conducted to further evaluate the legacy pressure evaluation method."

In comparing the 2020 report to that of 2018, key differences are evident. First, the 2020 report does not include a Discussion section which speaks to any operational changes which may influence the verification process; the 2018 report included this additional detail. Secondly, the basis of the weighted average pressure calculation has clearly changed as the same wells were not used in 2020 (either the High Inventory or Low Inventory versions) as were used in the 2018 report; presumably, this is due to several wells being plugged and abandoned in the interim. The 2018 report included discussion of the impacts of gas moving into and out of oil as solution gas and the resulting produced water-oil ratios; the 2020 report is silent on this issue along with any influence that aquifer encroachment may have had on the pressure-inventory relationship. Also, the weighted average reservoir pressure, P/Z, and Z factor listed for July 5, 2018, in Table 2 of the 2020 reports is different from those listed in the same table of the 2018 report; no explanation is included in the 2020 reports as to the basis for this change. Lastly, the 2018 report alludes to an independent third-party analysis of SoCalGas' internal inventory verification study; the 2020 study



makes no mention as to whether the internal report was reviewed and critiqued by an independent third-party reservoir engineering expert.

The Safety Ombudsman recommends:

- a. Application of a consistent methodology for calculating average reservoir pressure in the inventory verification process. If/when changes to the methodology are implemented a full and complete discussion of the changes should be incorporated into the reports to ensure transparency and validate any conclusions concerning inventory verification. Further, the methodology should be consistent with that contained in SoCalGas' Gas Standard GS 224.070 Reservoir Integrity and Inventory Assessment;
 - b. The report format should remain the same from year to year and include a discussion of the specific elements which can and do influence 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 elements which may influence the results of the inventory verification process;
 - 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 specific expertise in gas storage operations to perform an annual independent review of the results of its inventory verification analysis of Aliso Canyon. This will help ensure consistency, a comprehensive review of storage operations, and provide a "cold-eyes" check on operational changes that should be considered to help maintain reservoir integrity and/or any changes that may be necessary in the calculation methodology; and
 - f. Neither the 2018 report nor the 2020 report address the issue of how or whether station and/or compressor fuel usage and other diffuse gas losses (wellhead and other minor leaks) are accounted for in the inventory verification process. Proper accounting for these volumes is essential in the inventory verification process. It is unclear whether SoCalGas is properly accounting for these volumes at this stage. The Inventory Verification report should include a section which addresses these volumes and a discussion of how they are accounted for in the inventory verification process.
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.



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.