



Annual Report Number 1
Recommendations for Improvements Related to
Safety and Leak Prevention
April 2019 – June 2020

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Richard J Gentges
Safety Ombudsman



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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 generally 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 CPUC and CalGEM (formerly DOGGR) 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 generally include the following:

- Participate in all 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 Paragraph 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 April 2019 – June 2020. It is the first 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

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.

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

The Safety Ombudsman fully supports the recommendations of the WSOC listed immediately above.

The proposed Gas Standard should focus on critical communication steps necessary to ensure the safe transfer of well operations from SoCalGas's Above Ground Storage Operations group, who is responsible for day-to-day injection/withdrawal and routine monitoring operations, to its Underground Gas Storage Operations group who perform well intervention/maintenance activities. This should include a detailed checklist describing the status/condition of the well prior to and following any well intervention/maintenance activity, and sign-off of the respective parties indicating their understanding and acceptance of those conditions.

The concerns expressed in PHMSA's Inspection Output Report highlight gaps in recordkeeping requirements, one of the fundamental tenants contained in API 1171, Section 6, and CalGEM's recently promulgated Requirements for Underground Gas Storage Projects. SoCalGas should immediately initiate steps to correct these deficiencies and provide documentation to PHMSA once these issues have been addressed.

The Safety Ombudsman also reviewed and provided comments and recommendations on SoCalGas's Aliso Canyon Risk Management Plan (RMP). The framework for the RMP is SoCalGas's Storage Integrity Management Program (SIMP). The SIMP was established to meet the requirements of the California Code of Regulations, Title 14, Division 2, Chapter 4, Subchapter 1, Article 4, Requirements for California Underground Gas Storage Projects and Code of Federal Regulations (CFR) Chapter 49, Part 192, Subpart 192.12: Underground Natural Storage Facilities.

The SIMP document consists of fifteen (15) chapters and four (4) appendices which provide a comprehensive summary of the tools, methods, procedures, and resources employed to address state and federal regulatory requirements associated with monitoring and maintaining the integrity of the Aliso Canyon Facility. SoCalGas's internal procedures require that this document be reviewed and updated at a frequency of every three (3) years or less.

The Safety Ombudsman submitted a total of thirty-two (32) recommendations for improving the SIMP. Many of these comments were directed toward clarifying statements in the document. There are several instances where SoCalGas referenced pending development of new Gas Standards to address a void; the Safety Ombudsman strongly recommended such gaps be addressed as soon as possible. There were also several instances where discretionary language ("should") was used in place of prescriptive language ("shall") concerning various integrity-related activities; it was recommended that discretionary terms be replaced



with prescriptive terms where appropriate. A copy of the RMP which includes the recommended edits may be viewed via this link: [Click Here](#)

In addition to the above recommendations, the Safety Ombudsman developed the five (5) recommendations listed below for consideration of the WSOC/SoCalGas.

1. During the July 23, 2019 WSOC meeting, the Safety Ombudsman raised the issue of Organizational Systems as they relate to risk management. Organizational change is a constant in business/industry and the underground natural gas storage industry is no exception to that dynamic. Understanding and addressing risk, particularly complex engineering and geologic risks, requires technical breadth and depth. The same is true as it relates to recognizing and responding to abnormal operating conditions.

The recently imposed state and federal regulations covering underground gas storage facilities include comprehensive monitoring, verification, and reporting requirements. These new requirements can overwhelm subject matter experts entrusted with managing the assets unless they are adequately resourced and trained. Organizations with exposure to turnover of highly experienced staff with specialized technical expertise are particularly susceptible to this threat, as less experienced staff lack the institutional knowledge.

Root cause analysis of safety incidents frequently trace back to human/organizational elements as key contributing factors to mechanical failures. A key focus of PHMSA safety inspectors is threat interaction where physical threats may either be mitigated or activated as a function of human response or lack thereof. Thus, one of the most effective preventative and mitigative measures for reducing risk relates directly to organizational systems.

The Safety Ombudsman urged the WSOC to periodically review the overall makeup and structure of the Aliso Canyon storage organization and identify potential gaps in technical expertise. The review should include supervisory protocols to ensure adequate oversight exists for both company and contractor personnel, and that those resources meet the needs of the organization and are fully trained in and aware of the associated regulatory compliance requirements.

2. During the July 23, 2019 WSOC meeting, the Safety Ombudsman recommended the WSOC review and evaluate adaptation of relevant practices contained in ISO Standard 16530-1.2, Petroleum and Natural Gas Industries – Well Integrity, Part 1, Life Cycle Governance. The ISO is a world-wide federation of national standards bodies. ISO 16530 was developed by oil and gas producing operating companies as a compilation of best practices and is intended for use in petroleum and natural gas industries worldwide. It is intended to provide guidance to hydrocarbon well operators on managing well integrity throughout the well lifecycle. Major sections of this best practice document include:

- a. Common Elements of Well Integrity Life Cycle;
- b. Basis of Design Phase;
- c. Well Design Phase;
- d. Well Construction Phase;
- e. Well Operational Phase;
- f. Well Intervention Phase; and
- g. Well Abandonment Phase.



The Safety Ombudsman believes ISO 16530-1.2 is an outstanding resource to supplement the practices and standards associated with Facility operations. The Safety Ombudsman recommended that the WSOC review ISO 16530 and consider adaptation of relevant portions of the standard. Sections which may provide the greatest value to SoCalGas in terms of Facility safety include:

- a. Section 4.7, Barriers;
 - b. Section 6.4, Well Barriers;
 - c. Section 8.4, Well Monitoring and Surveillance;
 - d. Section 8.5, Annulus Pressure Management; and
 - e. Section 9, Well Intervention Phase.
3. Well integrity monitoring via casing inspection logs is a cornerstone of overall well integrity demonstration and verification. California now mandates that casing inspection logs be run at least once every 24 months unless the operator demonstrates that a well's corrosion rate is low enough that biennial inspection is not necessary. Timely analysis of the results of these inspections is essential to identifying wells at risk of failure due to high corrosion rates and/or severe defects.

The Safety Ombudsman requested data concerning apparent corrosion rates in Data Request Number 1 in March 2019. A follow-up request was made for this same data in July 2019; on November 8, 2019, SoCalGas responded indicating that "Corrosion rates were not provided because these calculations are not currently available. SoCalGas will provide this information to the Safety Ombudsman if and when it becomes available".

The Safety Ombudsman recommends that SoCalGas develop and implement procedures which ensure timely analysis of apparent corrosion rate and corrosion defect characterization. This will help facilitate identification of wells requiring immediate action to address potential integrity issues which could pose a threat to the safety of the Facility.

4. Remnant shallow gas accumulation(s) associated with the SS-25 leak may remain and pose a threat to the ongoing operation of the Facility. The Blade Energy Root Cause Analysis (RCA) raised this specific issue. Specifically, the RCA suggested that shallow gas accumulations likely dissipated due to abundant near-vertical fractures, while gas at depths below 200-300 feet may have migrated more laterally than vertically. Indeed, in the days immediately following the October 2019 Saddleridge fire, a previously unknown gas seep was discovered which ignited during the fire. The source of this gas is unknown, though it is possible it may be related to the SS-25 leak.

The Safety Ombudsman has had similar experience with subsurface leaks associated with two other natural gas storage facilities. In both cases, the subsurface leaks resulted in charging porous and permeable strata which extended laterally from the leak source. Surface leakage at one of the facilities initially bled down and ceased over the course of several months, only to return several years later at a nearby surface location.

SoCalGas should initiate an investigation of possible subsurface accumulation(s) of gas behind well casing in the area surrounding the SS-25 well. 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. Results of the



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.

5. Fidelity to safety standards is foundational to safe work practices. Detailed knowledge and understanding of SoCalGas's Gas Standards are key to maintaining safe work practices. California's Requirements for Underground Gas Storage Projects mandate extensive downhole integrity monitoring measures to verify storage well and reservoir integrity. The well intervention work necessary to comply with these regulatory requirements carry risk – specifically risk that human error may lead to a loss of control event while working on a well.

SoCalGas should initiate an internal audit of compliance with its Gas Standards associated with well intervention activities at the Facility. The audit should focus on those gas standards which relate directly to well work and integrity assessment to confirm that company and contractor personnel fully understand requirements contained in the gas standards and are performing work that fully complies with the standards. It is recommended that the audit initially focus on compliance with SoCalGas's Well Workover Standard, Casing Inspection Standard, and Management of Change Standard. Periodic assessment of compliance to other well safety-related standards should follow over the course of the next 2-3 years to confirm adherence to company standards and identify any opportunities for improvement.