



SAFETY OMBUDSMAN

**Virtual Townhall Meeting October 15, 2024
Annual Report Review**

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Overview

1. Experience/Background
2. Safety Ombudsman Role
3. Work of the Safety Ombudsman
4. Work of the Well and Storage Operations Safety Committee (WSOC)
5. Recommendation for Improvement



Safety Ombudsman Role

Experience/Background of Steve Nowaczewski

- Education, Experience, Professional Associations
- Risk Management and Safety
- Industry Service – including API 1171 Development
- Consulting and Integrity Management Maturity Advocacy
- RCP history with SoCalGas



Safety Ombudsman Role

Key Elements of Role

- Safety/Transparency Advocate
- Totally Independent of SoCalGas
- Investigate and Respond to Safety/Integrity Concerns
- Public/Regulatory Interface
- Interface with SoCalGas Aliso Canyon Safety Committee

Work of the Safety Ombudsman

Quarterly WSOC Meetings

2023-2024 Safety Ombudsman Reports (find reports through link below):

<https://safetyombudsman.com/home/resources/>

October 11, 2023 Virtual Public Meeting (presentation found at link below)

[Ombudsman Virtual Public mtg October 11 2023 – final version 09 19 23 – Safety Ombudsman/](#)

Concerns expressed by the public with respect to the Aliso Canyon facility:

- How SoCalGas evaluates risk related to seismic-induced fault displacement
- How SoCalGas makes decisions to manage such risk, including the application of subsurface safety valves or alternative mitigation measures

Work of the Safety Ombudsman

- CPUC and CalGEM Safety Inspections/Audits – CalGEM/PHMSA audit Feb 2023 – no findings of concern at the Aliso Canyon facility. No other audits during the July 2023-June 2024 reporting period.
- Fence Line Methane Monitoring System
 - Website: [SoCalGas Aliso Canyon Infrared Fence-Line Methane Monitoring System](#)
 - Reporting criteria: 25 ppm averaged over 30 minutes; no known events this reporting period
 - Also – independent monitor information can be found at <https://prcamp.argos-sci.info/>
- Safety-related Concerns/Complaints Submitted by the Public
 - No relevant inquiries received the past year, beyond the seismic-induced event risk and the use of subsurface safety valves.

Work of the Safety Ombudsman – Data Requests

Safety Ombudsman Data Requests

- Followed up on public inquiry and discussion at the October 11, 2023 meeting regarding SoCalGas evaluation of risk related to seismic-induced events and the use of subsurface safety valve systems to mitigate the risk
 - Data Request 19
 - Data Request 19A
 - Data Request 20
- Additionally, Data Request 21 asked for the current version of *SIMP Chapter 6, Management of Change*, which is the subject of the current WSOC Strengths-Weaknesses-Opportunities-Threats (SWOT) analysis
- The substance of each data request and summaries and/or links to the SoCalGas response is included in the report – however, I'll summarize each Data Request and response.

Work of the Safety Ombudsman – Data Request 19

Data Request #19 (11/20/23)

- Asked six questions relating to SoCalGas experience with subsurface safety valve (SSSV) designs; SSSV operation, maintenance, and testing practices, SSSV reliability and efforts to increase reliability, and the SoCalGas current application of SSSV to mitigate risk.
- SoCalGas responded on 3/1/24, attaching a historical SSSV application data set for Aliso Canyon as well as POS-002, the SoCalGas position paper on use of SSSV.

Summary opinion of the Ombudsman following DR#19 responses:

- SoCalGas responses were sufficient and detailed to allow the Ombudsman to independently estimate past reliability of deep-set and shallow-set safety valves the Company has used at Aliso Canyon.

Work of the Safety Ombudsman – Data Request 19

Summary findings and opinion of the Ombudsman following DR#19 responses:

- 409 SSSV installations at Aliso in 97 wells, 1972-present
- 13 installations, 1986-present, were shallow (depths of 367-524'), the rest were deep installations, 1972-1997, (depths averaging 7707' but ranging 3876-9144')
- Various manufacturers and designs; initially tubing-conveyed systems then followed by wireline-conveyed systems; shallow systems are tubing conveyed
- Poor reliability for deep systems – $R=.54$ and that is adjusted to include only the 11% of installations w/ functional life ≥ 1 year (the entire data set gives a negative reliability)
- Good reliability with shallow systems – $R=.95$

Work of the Safety Ombudsman – Data Request 19

Causes of SSSV reliability issues can include but not be limited to:

- Incorrect design and/or application
 - Faulty installation and/or commissioning
 - Incorrect or inadequate maintenance-inspection-testing
 - Control system failure due to damage to control system components or other cause of loss of functionality
 - Mechanical failure of the valve due to erosion, corrosion, impairment by debris, damage or breakage of components, equipment malfunction, or other cause of mechanical failure.
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- Many SSSV failures relate to control system (hydraulic) failures - more common with greater depth, thus a general industry observation of lower reliability for deep-set vs. shallow-set systems. SoCalGas tried many SSSV designs and setting depths at Aliso Canyon and other facilities.

Work of the Safety Ombudsman – Data Request 19A

Data Request #19A (3/14/24)

- Asked five overall questions, four regarding deep-set and shallow-set subsurface safety valve designs historically used in the Company's storage wells, and one question regarding the current SoCalGas evaluation of SSSV applicability in Aliso Canyon.
- SoCalGas response on 8/12/24 included a file detailing criteria relevant to the decision on potential SSSV applicability in Aliso Canyon wells. Each well remains subject to landslide risk review and seismic susceptibility risk review before decision-making on applicability of SSSV can be completed.
- SoCalGas had decided by the early 1980s to use shallow-set safety valves when necessary, and only use deep-set wireline retrievable valves in critical wells.

Work of the Safety Ombudsman – Data Request 19A

Summary opinion of the Ombudsman following DR#19A responses:

- For long-duration releases at surface or in the subsurface, potential environmental and safety impacts could be significant due to the maximum flow potential and the large reservoir feed source.
- Wells in Aliso Canyon that are susceptible to high risk of fault displacement might obtain potential beneficial risk mitigation effects from deeper safety valves, or from other other risk mitigations.
- Net risk change caused by the installation of SSSV in an individual well must be evaluated – the risk analysis must account for the reliability of the SSSV system and the potential safety, environmental, and financial impact effected by well workover frequency necessary to service SSSV system reliability failures.
- SoCalGas must complete the assessment of landslide and fault displacement risk for each well, complete the net risk change assessment, evaluate risk mitigation alternatives, and complete the decision process as to applicability of SSSV.

Work of the Safety Ombudsman – DR 19, 19A

The Ombudsman compared SoCalGas SV reliability to information from other sources:

- SINTEF (Norway) Reliability Data for Safety Equipment PDS Data Handbook, 2021 Edition.
- Reliability range .83 (wireline retrievable) to .96 (tubing retrievable)
- Failure rate assessment for TRSCSSV states that newer generations of valves (post 1995) have higher reliability than older designs; some new and improved designs have come out since 2000.
- WRSCSSV reliability is very sensitive to scale and debris buildup in the nipple profile, control line communication failure, and/or leaking piston seals. WRSSSV design and function principles have not changed appreciably over time.
- Recent Society of Petroleum Engineers discussion about reliability and applicability of SV in offshore wells mentions many similar concerns about reliability and the causes of reliability failures

Work of the Safety Ombudsman – Data Request 20

Data Request #20 – (11/21/23)

- Asked five questions regarding landslide and fault displacement threat assessment for Aliso Canyon wells, to help demonstrate or understand how:
 - Risk related to landslide and fault displacement is characterized
 - Susceptibility to landslide and fault displacement threats changed after reworking wells to add new inner casing strings and/or tubing strings.
 - Research related to gas storage risk (Battelle, C-FER) is applied in the risk assessments for Aliso Canyon gas storage wells.
- SoCalGas responded on 5/22/24, discussed with the Ombudsman at the June 2024 WSOC meeting, and later in June provided the Ombudsman with confidential, site-specific risk assessment information for its Aliso Canyon wells. SoCalGas actions were sufficient to provide the desired information, as summarized in the Work of the Ombudsman annual report.

Work of the Safety Ombudsman – Data Request 20

Risk Assessment Discussion Related to Data Request #20

- Preliminary risk assessment completed for 35 Aliso Canyon wells.
- Potential failure during well workover can be a significant contributor to the likelihood of fluid release'
- Dual barrier construction, pressure monitoring, casing inspection and repair lower the likelihood of fail/release.
- Some wells have elevated failure and fluid release potential, driven primarily by landslide mass movement and/or fault displacement, with conservative estimates revealing up to one-half order of magnitude greater threat for some wells comparing landslide risk to other threats (except for fault displacement) and up to one order of magnitude greater threat for some wells comparing fault displacement to other threats (other than landslide).
- Rates of loss of control during well workover also can be one-half order of magnitude higher than most well integrity threats.
- Net risk change estimates must be completed.

Recommendations Pursuant to DR 19, 19A, 20

- Update the “...finite element analysis previously performed at Aliso Canyon” (“...probability that a given fault displacement amplitude will result in a well failure is estimated leveraging finite element analysis previously performed...”)
- Model the change in resistance and resilience of the dual-casing-string wells to show the difference between before- and after-state of risk at the wells regarding failure due to mass earth movement.
- Define how the tubular failure frequencies for current wellbore completions with tubing/packer and/or new and additional cemented casing strings compare in an updated finite element analysis with the failure frequency over a 10-year period for each well to a 50-year and 100-year periods.
- Use a P90/P90+ potential leak scenario stemming from tubular failure at deep seated fault displacement with gas flow to the surface, when coupled with a longer-than-10-year review period for fault displacement tubular failure.

Recommendations Pursuant to DR 19, 19A, 20

- Develop and show the full risk potential envelope for the range of failure likelihood and consequence scenarios, where additional tubular strings were added to the wellbore profile, identify independent and redundant barriers, and show how secondary effects and co-dependent barrier elements (such as wellbore cement) are addressed in the probability chain.
- Select one well for demonstration installation of a current-technology deep subsurface safety valve system, considering in the evaluation well deliverability, proximity to fault displacement threat, world experience with reliability of deep-set SSSV systems, and consultation with subsurface safety valve system manufacturers. Develop maintenance, inspection, and testing practices for the system, then monitor the performance reliability of the installation over a period sufficient to demonstrate the potential range of reliability and the net risk change.



Work of the Safety Ombudsman – Data Request 21

Data Request #21 - The Ombudsman requested an up-to-date copy of the Management of Change procedure, which SoCalGas identified as Data Request #21 and provided on March 1, 2024. The request related to the planning of a SWOT (Strengths-Weaknesses-Opportunities-Threats) exercise the WSOC was preparing to do pursuant to its Consent Decree duties.



Work of the WSOC

Key Elements

- Eight-Year Commitment
- Role: Safety Monitoring and Improvement Activities:
 - Quarterly Meetings
 - Focus on Well Integrity and Leak Prevention
 - Make Recommendations for Repairs/Improvements and Policies
 - Facilitate Role of and Work Cooperatively With Ombudsman
- WSOC Charter and Meetings

Work of the WSOC July 2023-June 2024

- No new WSOC recommendations this period.
- WSOC members participated in assembling and conveying information responsive to Ombudsman Data Requests and provided detailed discussion on well integrity and reservoir integrity risk assessments
- WSOC meetings include review and discussion of the well work and well integrity assessments completed or in progress. As of June 2024:
 - Active well count is sixty (60) injection/withdrawal (I/W) wells, forty-three (43) with complete new inner casing/tubing strings since 2016.
 - Fifty-four (54) wells plugged and abandoned since late 2016.
 - All wells have had 2nd-round integrity assessments, which includes casing inspection logs; forty (40) wells have had 3rd-round assessments, and five (5) wells have had 4th-round assessments.

Work of the WSOC – Public Agency Interaction

- CPUC and CalGEM Safety Inspections – None since February 2023, where there were no findings with respect to Aliso Canyon.
- CalGEM responses on requests for well inspection interval variances, as of June 2024:
 - CalGEM granted permission to extend the assessment interval from twenty-four (24) months to as much as 50-60 months on sixty (60) requests (the extensions might have been granted in more than one request on the same well).
 - CalGEM decision is pending on an additional 11 wells.
 - CalGEM denied extension of reassessment intervals for 6 wells.



Work of the WSOC – Audits and/or SWOT

- At the December 2023 meeting, the WSOC approved a SWOT (Strengths-Weaknesses-Opportunities-Threats exercise) for SIMP.6 Management of Change.
- The SWOT is in progress and outcomes will be summarized in the next cycle's annual reports covering the July 2024 – June 2025 period.

Recommendations for Improvements

- Part A: New Recommendations During the July 2023 – June 2024 Period
 - Recommendations pursuant to Data Requests 19, 19A, 20 were previously addressed
 - Update on recommendation to improve emergency response plans – SoCalGas is progressing
 - Additional new recommendation (5a, b, c) regarding reservoir risk assessment methodology
- Part B: Report on SoCalGas Progress in Responding to Recommendations Made in Prior Periods
 - B-1: Recommendations made by the WSOC, closed
 - B-2: Recommendations made by the Safety Ombudsman, closed
 - B-3: Recommendations made by the Safety Ombudsman, open

Recommendations for Improvements

Safety Ombudsman Compendium of All Recommendations, Status and Progress Tracker

- Part B: Report on SoCalGas Progress in Responding to Recommendations Made in Prior Periods
 - B-1: Recommendations made by the WSOC, 4 actions closed
 - B-2: Recommendations made by the Safety Ombudsman, 14 actions closed
 - B-3: Recommendations made by the Safety Ombudsman, 4 previous recommendations open

SoCalGas continues to progress in responding to the recommendations

Next Steps

- Review feedback from virtual public meeting
 - Incorporate recommendations for improving utility of future reports
- Ongoing attendance at WSOC Meetings
- Responding to issues/concerns posted to Safety Ombudsman Website – the link is on the next slide...



Questions?

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