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| Date Served: | : | March 12, 2021 |
| SED Witness | : | M. Felts |

**SAFETY ENFORCEMENT DIVISION**
**CALIFORNIA PUBLIC UTILITIES COMMISSION**

# CHAPTER FIVE
# PREPARED SUR-REPLY TESTIMONY OF MARGARET FELTS IN RESPONSE TO REPLY TESTIMONY OF TRAVIS SERA

San Francisco, California
June 30, 2020

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## I. INTRODUCTION

The purpose of the following prepared Sur-Reply testimony, submitted on behalf of the California Public Utilities Commission's ("Commission") Safety Enforcement Division ("SED"), is to reply to testimony of Travis Sera regarding violations 1-60. Mr. Sera restated these violations as follows: "SED alleges SoCalGas violated California Public Utilities Code (Section 451) because it failed 'to investigate the blowout from well FF-34A and other instances of supposed leaks (Violations of 1-60)."[1] As listed in the Table of Violations of my testimony, these violations are:[2]

| **Violation Number** | **Summary of Violation** |
|---|---|
| 1 | "No investigation of blowout from well Frew 3." |
| 2 | "No investigation of blowout from well FF-34A." |
| 3 | "No investigation of one of four parted well casings." |
| 4 - 6 | "No investigation of any of three parted well casings." |
| 7 - 60 | "No investigation of 54 well leaks." |

Collectively, these violations are stated with more specificity on page 7 of my Opening Testimony: "SoCalGas failed to perform failure investigations, failure analyses or root cause analyses on failed Aliso Canyon wells despite more than 60 well casings experiencing leaks, four having parted casings, and several wells having casing corrosion identified. Therefore, SoCalGas lacked important information and background that they could have used to anticipate the extent and consequences of corrosion in its other wells, including well SS-25."[3]

These violations arose because SoCalGas did not investigate the *cause* of casing failures.

[1] Sera Testimony, p. 1, lines 8-10.

[2] Opening Testimony of Margaret Felts, p. 3.

[3] Opening Testimony of Margaret Felts, p. 7.

## II. LEAKS DISTINGUISHED FROM RUPTURES – MR. SERA'S TESTIMONY DEFINES LEAKS DIFFERENTLY THAN THE PIPELINE HAZARDOUS MATERIALS AND SAFETY ADMINISTRATION, BLADE'S ROOT CAUSE ANALYSIS, AND THE OIL AND GAS INDUSTRY

Mr. Sera is Director of Integrity Management, which includes oversight of the transmission and distribution integrity management programs.[4] His testimony presents basic engineering principles,[5] and PHMSA requirements applicable to SoCalGas 'TIMP (Transmission) and DIMP (Distribution) integrity management programs, which enforce 49 CFR Part 192. However, Mr. Sera makes this unusual statement, without any reference, that strays from PHMSA definitions:

> Wall loss anomalies in pressure-containing tubular structures like pipes can fail by either leak or rupture once they grow to a critical size – i.e., a size that reduces the failure pressure equal to or below (≤) the operating pressure. Whether the structure fails by leak or rupture depends upon 1) the material properties of the structure, 2) the 1 [sic] size, shape, and orientation of the flaw, and 3) the level of stress applied to the flaw. *As a general matter with regard to corrosion related wall loss, leaks are typically associated with deeper flaws that do not propagate in length after initial perforation of the full wall thickness. In contrast to leaks, ruptures are typically longer in axial length to a degree sufficient to promote a localized elevated stress state (often resulting in bulging) and eventual through-wall failure. Ruptures are distinguished from leaks in that the flaw propagates or extends beyond the initial dimension of the perforation, and typically in the axial direction for hoop stress-related failures*.[6] (Emphasis added.)

This elaborate explanation of leak vs rupture, quoted in italics, goes well beyond standard definitions in the industry as illustrated by PHMSA's glossary definitions: "A **leak** is a small opening, **crack**, or hole in a **pipeline** allowing a release of oil or gas."[7]

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[4] Sera Testimony, p. 6, Witness Qualifications, line 2-3.

[5] See for example, p. 1, Section II beginning line 17, "Leaks Distinguished from Ruptures".

[6] Sera Testimony, p. 2, lines 2-8.

[7] https://primis.phmsa.dot.gov/comm/glossary/index.htm#Leak

A **rupture** is the process or instance of breaking open or bursting, as in the rupture of a pipe.[8] (Emphasis added.)

SED also asked Blade whether this quote from Mr. Sera's testimony defined the term "leak" the same way as the RCA did. Blade answered, "No.",[9] and explained as follows:

> The term "leak" in the first passage of Question 2 (from Mr. Sera's testimony) indicates a failure mode. The Blade reports generally used the word "leak" to indicate a flow path or hole that allowed fluid flow from inside the casing to the outside. When the SS-25 casing failure was discussed, the word "rupture" was used to describe the type or mode of failure. Obviously, a rupture in the casing is also a leak that allows flow, but the converse is not always true. A leak is not necessarily a rupture. The two definitions of the word "leak" as discussed are consistent with commonly used definitions in the oil and gas industry for casing failure and failure analysis depending on the context.[10]

SED then asked Blade how the term "leak" is defined in the Blade RCA. Blade answered as follows:

> The term "leak" as used in the Blade Root Cause Analysis is consistent with the definitions commonly used in the oil and gas industry for failure and failure analysis, and is used appropriately throughout the Blade Main Report and Supplementary Reports. The term "rupture" was used in the discussion of the failure mode in the RCA. For example, the first paragraph of the Executive Summary on page 1 of the Blade Main Report, states: "The Standard Sesnon 25 (SS-25) well was shut in at 3:30 PM on October 23, 2015; a leak was discovered at 3:15 PM. The 7 in. production casing had axially ruptured and circumferentially parted. This resulted in a blowout and gas release into the atmosphere, which lasted for 111 days, until the well was eventually killed via a relief well on February 11, 2016." Here the term "a leak" is the general term indicating a flow path from inside the casing to the atmosphere while the terms "axially ruptured and circumferentially parted" defined specific failure modes.

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[8] https://primis.phmsa.dot.gov/comm/glossary/index.htm#Rupture

[9] Blade Response to SED Data Request 82, Response 2.2.1, pp. 6-7, June 12, 2020.

[10] Blade Response to SED Data Request 82, Response 2.2.1, pp. 6-7, June 12, 2020.

> The discussion of failed casing in the Blade Main Report and Supplementary Reports used the general term "leak" to reflect the fact that casing leaks were identified but no details regarding the nature or cause of these leaks and failures were available because no failure analyses were done based on the data available to Blade. For example, the fourth paragraph of the Executive Summary on page 2 of the Blade Main Report, states: "The Aliso Canyon storage wells had numerous casing leaks. Blade reviewed 124 gas storage wells and identified 63 casing leaks, 29 tight spots, 4 parted casings, and 3 other types of failures. Based on the data available to Blade, no details regarding the nature or cause of these leaks and failures were available because no failure analyses were done.[11]

Mr. Sera goes on to explain the importance of recognizing leakage vs. rupture in the process of evaluating overall risk.[12] However, he does not explain how this discussion absolves SoCalGas of investigating the causes of well casing leaks or parted casings.

## III. SOCALGAS CANNOT IGNORE LEAKS AND JUST WAIT TO INVESTIGATE A RUPTURE

Mr. Sera refers to my testimony as characterizing historical casing issues as primarily leaks, not rupture.[13] He notes that prior to the SS-25 casing rupture, failure history at Aliso canyon did not represent or suggest the risk of release that occurred at SS-25.[14] Mr. Sera fails to consider the age of the Aliso wells, the lack of inspections, the absence of corrosion control on many of the wells, and the increasing frequency of leaks identified by SoCalGas engineers who were familiar with Aliso wells.[15] Mr. Sera has failed to consider the age of the Aliso wells despite the fact that SoCalGas' recent General Rate Case testimony recognizes the possibility of a well related incident, given the age of the wells and their heavy utilization.[16]

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[11] Blade Response to SED Data Request 82, Response 2.2.1, p. 7, June 12, 2020.

[12] Sera Testimony, p. 3, lines 7-14

[13] Sera Testimony, p. 3, lines 17-19.

[14] Sera Testimony, p. 3, lines 19-21.

[15] 1985.0402.F-3 All-5.Delay.in.Repairs.Several.Wells

[16] "SoCalGas Direct Testimony of Phillip E. Baker Underground Storage, November, 2014", PEB-18, lines 15-17.

Mr. Sera quotes a 2016 PHMSA report regarding the difficulty of predicting catastrophic events.[17] Although this report is about pipelines, not gas wells, the basic statement is applicable. The solution implemented for pipelines is rigorous inspection, monitoring and documentation.[18] Under 49 CFR Part 192, pipeline operators are required to be investigate pipeline failures to determine the cause of the failures.[19] SoCalGas is familiar with the process because it operates pipelines under 49 CFR Part 192 regulations and has TIMP and DIMP Integrity Management programs, which Mr. Sera manages.

Mr. Sera notes that in the case of the SS-25 failure, no known examples of this type of well casing failure associated with microbially influenced corrosion (MIC) attack exist in the industry record.[20] However, despite the exact source, corrosion of any type could have been detected if SoCalGas had made the effort to inspect the casing prior to the failure.

Another example of failure to act proactively with inspections, is Well FF-34. A casing blowout at FF-34A probably could have been avoided if SoCalGas had inspected it proactively.[21] Apparently, after the blowout and during the workover, SoCalGas

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[17] Sera Testimony, p. 4, lines 2-8.

[18] 49 CFR Part 192. See for example, 49 CFR Section 192.917(b). "*Data gathering and integration*. To identify and evaluate the potential threats to a covered pipeline segment, an operator must gather and integrate existing data and information on the entire pipeline that could be relevant to the covered segment." In performing this data gathering and integration, an operator must follow certain requirements, and "consider both on the covered segment and similar non-covered segments, past incident history, corrosion control records, continuing surveillance records, patrol records, maintenance history, internal inspection records and all other conditions specific to each pipeline." This is prescribed in answer to the question raised in this section of the regulations: "How does an operator identify potential threats to pipeline integrity and use the threat identification in its integrity program?"

[19] See for example, 49 CFR Section 192.617. "Each operator shall establish procedures for analyzing accidents and failures, including the selection of samples of the failed facility or equipment for laboratory examination, where appropriate, for the purpose of determining the causes of the failure and minimizing the possibility of a recurrence."

[20] Sera Testimony, p. 4, lines 13-14.

[21] See Opening Testimony of Margaret Felts, p. 8, "Additionally, the FF- 34A Well File mentioned a study of possible external casing corrosion problems in the southeastern portion of the field, but Blade was not able to locate any documentation related to this study." Also see, footnote 27, referencing Blade RCA, p. 2. Blade noted there that well FF-34A experienced an underground blowout in 1990, and that was one of the well incidents in which SoCalGas did not perform an investigation. Blade highlighted

discovered external corrosion and decided to put Cathodic Protection on the well casing in 1992.[22]

Inspections performed over time will provide a picture of what is happening to wells in a well field such as Aliso. Preventative maintenance plans can be developed based on that information, which would theoretically find and/or prevent corrosion before leaks occur, thus minimizing long term costs.

Mr. Sera states "a pinhole leak and a "SS-25-like" release are not equivalent in terms of likelihood of failure, consequence of failure, or overall risk, and they should not be considered to be the same,"[23] suggesting that violations 1-60 somehow should not be considered violations because they are leaks, not ruptures like SS-25. He misses the point of the violations completely.

## IV. BLADE DISAGREES WITH THE CONCLUSION OF MR. SERA'S TESTIMONY

Mr. Sera's testimony concludes, "For the foregoing reasons, a failure analysis of any of the historical leaks described in the Blade Report would very likely not have informed or predicted the SS-25 incident."[24] SED asked Blade if it agreed with this conclusion. Blade answered, "No.",[25] and explained as follows:[26]

> One cannot conclude that the analysis of the historical leaks would not inform or predict the SS-25 incident because the historical leaks were not analyzed by SoCalGas according to data provided to Blade.
>
> In the Executive Summary of Blade's Main report, page 2, Blade stated, "Based on the data available to Blade, no details regarding the nature or cause of these leaks and failures were available because no failure analyses were done. Forty percent of the gas storage wells

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well FF-34A as one of the wells that experienced a leak because the well file for that well mentioned a study of possible external casing corrosion problems. Blade said it could not find the study.

[22]AC_CPUC_0022178.FF34-A.CP

[23] Sera Testimony, p. 3, lines 13-14

[24] Sera Testimony, p. 5, lines 11-12.

[25] Blade Response to SED Data Request 82, Response 2.1.1, p., June 12, 2020.

[26] Blade Response to SED Data Request 82, Response 2.1.1, pp. 5-6, June 12, 2020.

reviewed by Blade had casing failures with an average of two casing failures per well. The FF-34A well file mentioned a study of the possible external casing corrosion problems in the southeastern portion of the field, but Blade was not able to locate any documentation related to this study [reference omitted]".

Prior to October 23, 2015, none of the historical leaks caused a release of gas into the atmosphere similar to SS-25. However, to conclude that the failure in the SS-25 production casing was somehow different from every other leak in the field requires an investigation and evaluation of historical leaks. In other words, the consequence of the SS-25 7 in. casing failure was different and much more severe, but the underlying cause may have been similar, or not, to previous casing failures. The data provided to Blade indicated casing failures were investigated to determine their location in the well; in almost all cases, the question of where did the casing failure occur was answered. But Blade did not find the answers to questions such as: why did the casing failure occur, when will it occur again, and how can we prevent these failures. Because of this information gap, any comparison of the SS-25 failure to other Aliso Canyon casing failures was partial and lacking.

The occurrence of casing corrosion was recognized by SoCalGas. As discussed in Blade Main Report on page 239 "The limitations of this reactive approach to well integrity management was identified by SoCalGas in 2014 as evidenced by the SIMP proposal in the 2016 General Rate Case Submission. OD [Outside Diameter] corrosion on production casing was identified as a threat". The following statements are from that testimony [1, pp. PEB 18 - PEB 19] (verbatim):

> The primary threats to the SoCalGas well facilities that SIMP will address are internal and external corrosion, and erosion. [footnote omitted] Once an issue is identified, the initiation of critical repair work identified will immediately minimize safety risks.
>
> Presently, most major O&M and capital funded activities conducted on storage wells are typically reactive-type work, in response to corrosion or other problems identified through routine pressure surveillance and temperature surveys. . . . In most cases, situations like this can be indicative of production casing leaks from either internal or external corrosion where high pressure gas can migrate to the surface in a matter of hours.

> External corrosion has also been observed in other wells at the field.[27]

Presently, most major O&M and capital funded activities conducted on storage wells are typically reactive-type work, in response to corrosion or other problems identified through routine pressure surveillance and temperature surveys.

Furthermore, in their rate case testimony (page 17), SoCal Gas stated the following (verbatim):

> A proactive, methodical, and structured approach, using state-of-the-art inspection technologies and risk management disciplines to address well integrity issues before they result in unsafe conditions, or become major situational or media incidents, is a prudent operating practice.[28]

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[27] See "SoCalGas Direct Testimony of Phillip E. Baker Underground Storage, November, 2014", p. PEB-18, lines 20-22, and PEB-18 line 24 to PEB-19 line 2.

[28] See "SoCalGas Direct Testimony of Phillip E. Baker Underground Storage, November, 2014", p. PEB-17, lines 7-10.