2025 Risk Assessment Mitigation Phase

(Chapter SCG-Risk-1)

Excavation Damage

May 15, 2025

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I. INTRODUCTION

The purpose of this chapter is to present Southern California Gas Company's (SoCalGas or Company) risk control and mitigation plan for excavation damage. This chapter contains information and analysis that meet the requirements of the California Public Utilities Commission's (Commission or CPUC) Risk-Based Decision-Making Framework (RDF),[1] including the requirements adopted in Decision (D.) 22-12-027 (Phase 2 Decision)[2] and D.24-05-064 (Phase 3 Decision).[3] Excavation Damage is included in the 2025 RAMP Report based on a safety risk assessment, further informed by its reliability and financial consequence attributes, consistent with RDF guidance. This risk chapter describes the basis for selection of Excavation Damage, the controls and/or mitigations put forth to reduce the likelihood or consequence of this risk, a discussion of alternative mitigations considered but not selected, and a graphic to show historical progress. This chapter presents cost and unit forecasts for the risk mitigating activities, but it does not request funding. Any funding requests for this risk will be made through the Company's Test Year (TY) 2028 General Rate Case (GRC) application. Finally, this chapter describes the methods applied to estimate the risk's monetized, pre-mitigated risk, the estimated risk-reduction benefits of each included control and mitigation, and the calculation of Cost-Benefit Ratios (CBRs) for each control and mitigation consistent with the method and process prescribed in the RDF.

A. Risk Definition and Overview

1. Risk Definition

For the purposes of this RAMP Report, SoCalGas's Excavation Damage is defined as the risk of a dig-in on the natural gas system (high or medium pressure) caused by excavation activities, which results in an uncontrolled release of gas and the potential for serious injuries, fatalities, and/or damage to the infrastructure.

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1 As discussed in Volume 1, Chapter RAMP-1, the RDF Framework broadly refers to the recent modifications to the Commission's Rate Case Plan adopted in Rulemaking (R.) 13-11-006, Safety Model Assessment Proceeding A.15-05-002 et al. (cons.), and R.20-07-013 (the Risk OIR), including D.24-05-064, Appendix A.

2 D.22-12-027 is the "Phase II Decision Adopting Modifications to the Risk-Based Decision-Making Framework Adopted in Decision 18-12-014 and Directing Environmental and Social Justice Pilots" (December 21, 2022).

3 D.24-05-064 is the "Phase III Decision" (June 6, 2024).

Certain controls and mitigations presented in this chapter are subject to compliance mandates beyond RDF reporting requirements, such as those from the CPUC's General Order (GO) 112-F and PHMSA, including but not limited to subparts of Rule 49 Code of Federal Regulations (CFR). A list of compliance requirements applicable to Excavation Damage is provided in Attachment A. Certain mitigation programs have value beyond the estimated risk reduction calculated under the RDF, such as enhancing operations, alignment with sustainability goals, and improving customer service.

2. Risk Overview

SoCalGas operates and manages a natural gas system of over 101,000 miles of distribution pipe and 3,385 miles of transmission pipe within its 24,000 square mile service territory. Pipe mileage can be further segregated into general operating pressure categories of Medium Pressure (MP) which operates at or less than 60 psig,[4] and High Pressure (HP) which operates above 60 psig. The expansive SoCalGas underground piping network has the potential for dig-in related incidents. This risk highlights the consequence and likelihood of dig-in damage that causes a release of natural gas, damages property, or causes personal injury due to excavation activity.

SoCalGas has been mitigating dig-in risk to its underground gas infrastructure for decades. Dig-ins are a common risk for all utilities and industries with buried infrastructure and is not unique to SoCalGas. Excavation activities can vary widely based on project scope and size. Examples include a homeowner doing landscaping work, a plumber repairing a sewer line, or a city upgrading its aging municipal water or sewer systems. Excavation damage consequences can range from minor scratches or dents potentially leading to external corrosion, to ruptures with an uncontrolled release of natural gas potentially leading to ignition and serious injuries and/or fatalities. A leak or rupture may also occur after the infrastructure has sustained damage that has accumulated over time. Damage that does not result in a release of gas is less often not reported by the responsible party. Unfortunately, SoCalGas cannot always assess the pipe for damage and make the appropriate repairs to preserve the integrity of the pipe.

Federal and state agencies acknowledge the serious consequences of dig-in risk and have responded by adopting several regulations and industry standards and by supporting awareness

[4] Pounds per square inch gauge.

efforts to help prevent dig-ins. For example, the Department of Transportation (DOT) sponsored the "Common Ground Study," completed in 1999. Subsequently, the "Common Ground Study" led to the creation of the Common Ground Alliance (CGA), a member-driven association of 1,700 individuals, organizations, and sponsors in every facet of the underground utility industry. With industry-wide support, CGA created a comprehensive consensus document that details the best practices addressing every stakeholder groups' activities in promoting safe excavation and dig-in prevention. Please see Attachment A for a list of the Compliance Drivers.

Under California state law, an excavator planning excavation work is required to contact the Regional Notification Center for their area, also known as Eight-One-One (811) or Underground Service Alert (USA), at least two full working days prior to commencing construction excavation activities, not including the day of the notification.[5] "811" is the national phone number designated by the Federal Communications Commission (FCC) that connects homeowners or contractors who plan to dig with professionals through a local call center. California has two Regional Notification Centers, DigAlert and USA North 811, that split California at the Los Angeles/Kern County and Santa Barbara/San Luis Obispo County lines; USA North 811 serves all counties north of the county lines and DigAlert serves all counties south of the county lines. DigAlert and USA North 811 will be referenced as 811 USA for the remainder of this chapter.

Once an excavator makes contact, the Regional Notification Center will issue a USA Ticket notifying local utilities and other operators of the location and areas to be inspected for potential conflicts of underground infrastructure with the pending planned excavation work. Operators are then required to provide an electronic positive response to indicate that there are no facilities in conflict or to mark their underground facilities via aboveground identifiers (*e.g.,* paint, chalk, flags, whiskers) to designate where underground utilities are positioned, thus enabling excavators, like contractors and homeowners, to know where substructures are located. The law also requires excavators to use careful, manual (hand digging) methods to expose substructures prior to using mechanical excavation tools.

While these efforts are important and commendable, and the number of dig-ins per 1,000 excavation tickets within the industry has been trending down (Figure 1), excavation damage

[5] Cal. Gov. Code § 4216.2(b).

incidents continue. Excavation tickets are a common metric used throughout the industry to gauge the impact of a damage prevention program. Figure 1 represents industry trends for dig-ins on distribution lines. Excavation data for transmission incidents are less frequent and harder to trend. Thus, the DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) collects ticket totals in annual reports for distribution facilities but did not collect ticket information for transmission facilities before 2024.

Figure 1

Excavation Damage: Excavation Tickets & Incidents

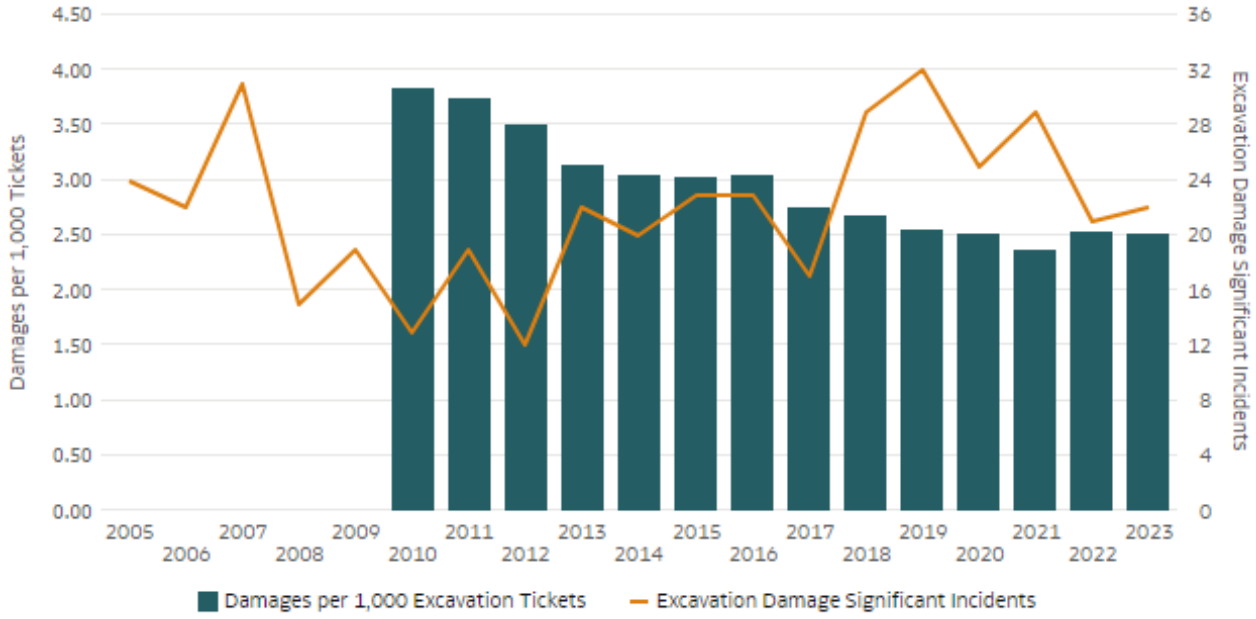
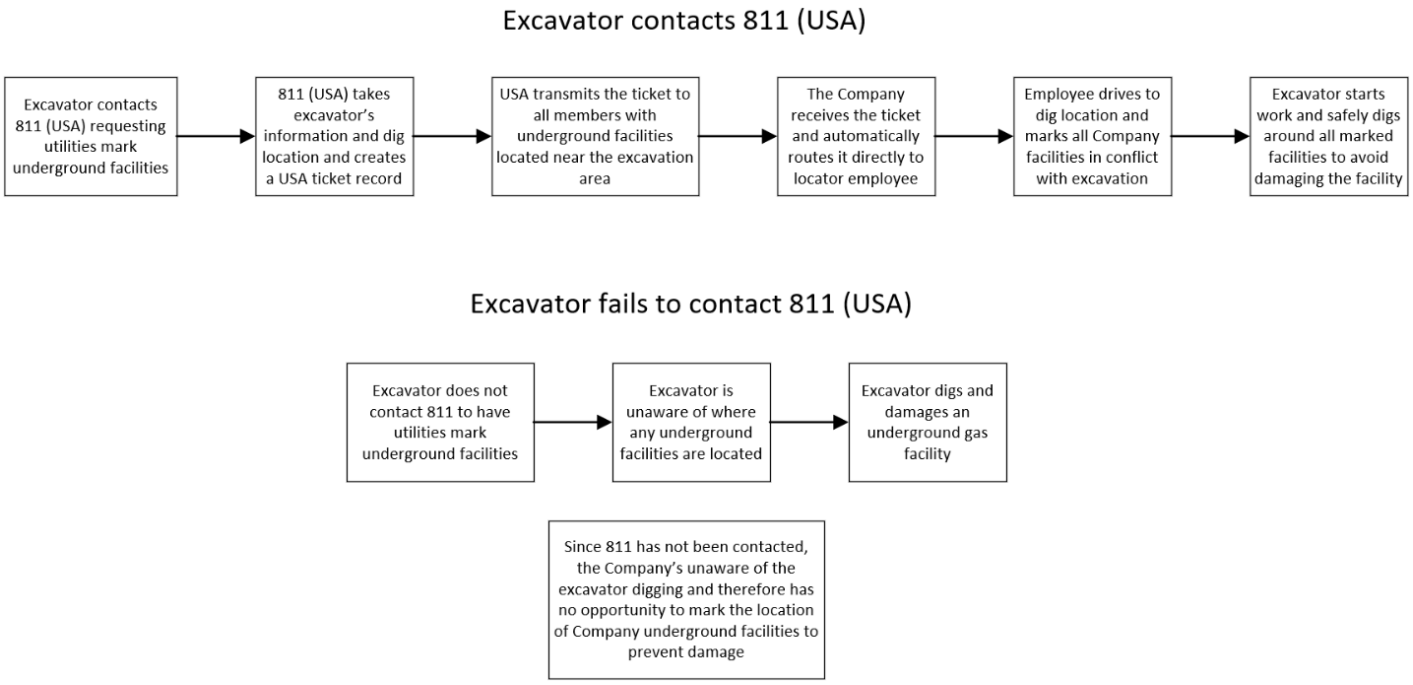


Figure 2 below illustrates the sequence of events that may occur when an excavator contacts 811 USA prior to conducting excavation work and, in contrast, the sequence that may occur when they do not. When excavators call 811 USA before excavating, the risk of a dig-in is reduced.

Figure 2

Excavation Damage: Excavation Contact Process Flow



SoCalGas managed over 1,030,000 811 USA tickets and reported approximately 2,400 dig-in excavation damage incidents in 2024. Analysis of the data collected during routine damage investigations indicates that about the majority of damages were caused by a lack of notification to 811 USA for a locate and mark ticket and the next greatest cause was inadequate excavation practices even after the excavator called 811 USA and underground facilities were properly marked.

In addition to direct involvement with excavators and 811 USA, SoCalGas promotes safe digging practices through its Public Awareness Program and safety messaging through stakeholder outreach. This messaging is presented by way of multi-formatted educational materials through mail, email, social media, television, radio, events, and association sponsorships.

B. Risk Scope

SoCalGas's analysis considers risk events owing to Excavation Damage, which includes both medium and high-pressure pipelines upstream of customer gas meters, regardless of the party (1st, 2nd, 3rd) that result in consequences including serious injuries and/or fatalities.

C. Data Sources Used to Quantify Risk Estimates[6]

SoCalGas utilized internal data sources to determine an Excavation Damage Pre-Mitigation Risk Value and calculate risk reduction estimates for mitigation activities (which enables estimation of Post Mitigation Monetized Risk Values and Cost Benefit Ratios). Where internal data is deemed insufficient, supplemental industry or national data is used, as appropriate, and adjusted to account for the risk characteristics associated with the Company's specific operating locations and service territory. For example, certain types of incident events have not occurred within the SoCalGas and SDG&E service territories. Expanding the quantitative data sources to include industry data where such incidents have been recorded is appropriate to establish a baseline of risk and risk addressed by mitigative activities. Attachment B provides additional information regarding these data resources.

II. RISK ASSESSMENT

In accordance with Commission guidance, this section provides a qualitative description of Excavation Damage, including a risk Bow Tie, which delineates potential Drivers/Triggers and Potential Consequences, followed by a description of the Tranches determined for this risk.

A. Risk Selection

Excavation Damage was included as a risk in SoCalGas's 2021 RAMP and was included in SoCalGas's 2022, 2023 and 2024 Enterprise Risk Registries (ERR). SoCalGas's ERR evaluation and selection process is summarized in Chapter RAMP-2, Enterprise Risk Management Framework.

SoCalGas selected this risk in accordance with the RDF Row 9.[7] Specifically, SoCalGas assessed top risks from the Company's 2024 ERR based on the Consequence of a Risk Event (CoRE) Safety attribute. Excavation Damage was among the risks presented in SoCalGas's list of Preliminary 2025 RAMP Risks on December 17, 2024, at a Pre-Filing Workshop. Excavation Damage was selected based on the qualification of its Safety risk attribute, as required under the RDF for required presentation. At the Pre-Filing Workshop, no party expressed opposition to the inclusion of this risk in SoCalGas's 2025 RAMP Report.

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[6] Copies and/or links to these data resources are provided in the workpapers served with this Report on May 15, 2025.

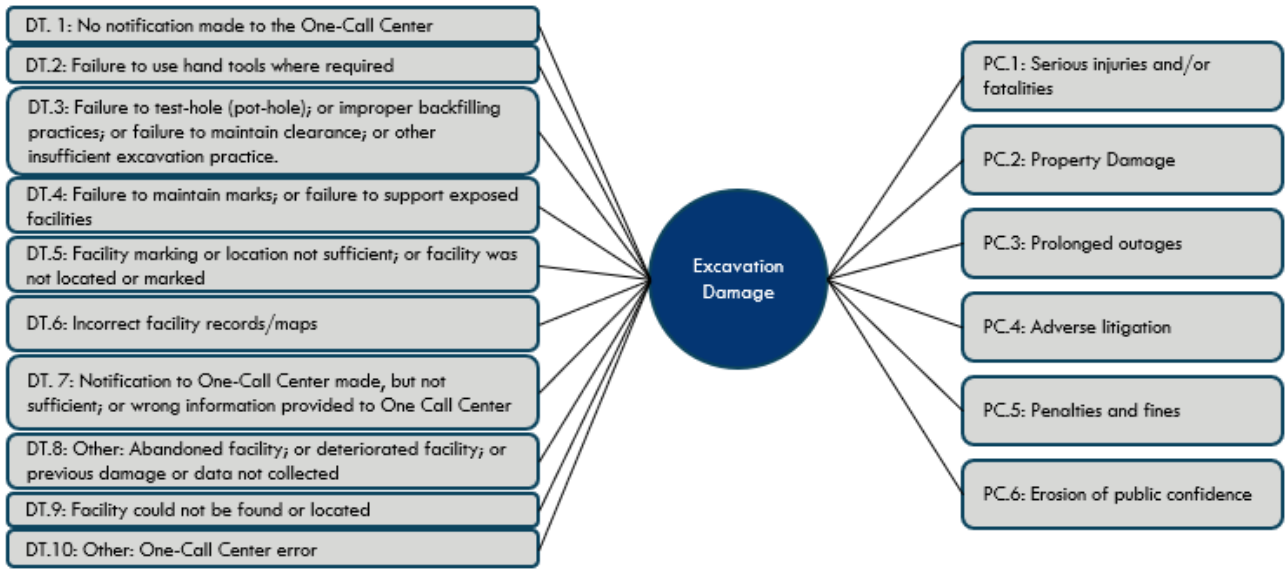
[7] RDF Row 9 states that risks to be included in the RAMP Report, at minimum, are those identified in the Company's Enterprise Risk Register (ERR) comprising "the top 40% of ERR risks with a Safety Risk Value greater than zero dollars".

B. Risk Bow Tie

In accordance with Commission requirements, this section describes the risk Bow Tie, possible Drivers, potential Consequences, and a mapping of the elements in the Bow Tie to the mitigations that address it.[8] As illustrated in the risk Bow Tie shown below in Figure 3, the Risk Event (center of the Bow Tie) is an asset failure owing to Excavation Damage, the left side of the Bow Tie illustrates Drivers/Triggers that could lead to the Excavation Damage that could cause asset failure, and the right side shows the Potential Consequences of the Excavation Damage. SoCalGas applies this framework to identify and summarize the information provided in Figure 3. A mapping of each mitigation to the addressed elements of the risk Bow Tie is provided in Attachment C.

Figure 3

Excavation Damage: Risk Bow Tie



[8] D.24-05-064, RDF Row 15.

C. Potential Risk Event Drivers/Triggers[9]

When performing a risk assessment for the Excavation Damage Risk, SoCalGas identifies potential leading indicators, referred to as Drivers or Triggers, that reflect current and/or forecasted conditions and may include both external actions as well as characteristics inherent to the asset.[10] These Bow Tie Drivers/Triggers inform the Likelihood of a Risk Event (LoRE) component of the risk value. These include:

- **DT.1 –** No notification made to the One-Call Center: Excavators such as contractors or property homeowners/tenants do not follow 811 One-Call Dig Safe law requirements (USA) for locate and mark prior to excavation. Despite the creation of Regional Notification Centers to inform and allow excavators to have underground infrastructures located and marked, and advertising campaigns alerting excavators of the need to notify 811 USA, incidents still occur where excavations are conducted without such notification. In fact, third party failure to contact the Regional Notification Centers prior to excavating is the leading contributor of damages to Company pipelines. Third parties can damage or rupture underground pipelines and potentially cause property damage, injuries, and/or fatalities. Without receiving an 811 USA ticket, the Company has no opportunity to mark its facilities within the area of excavation and mitigate this risk, which could lead to one or many of the potential consequences listed below occurring.
- **DT.2 –** Failure to use hand tools where required: Before using any power-operated excavation equipment or boring equipment, the excavator is required to hand expose, using "Hand Tools," to verify the exact location and that no conflicts exist within 24 inches of either side of the gas pipeline. Excavators put themselves and others at risk for injury when they do not exercise caution when digging near natural gas pipelines, which could lead to one or many of the potential consequences listed below occurring.

[9] An indication that a risk could occur. It does not reflect actual or threatened conditions.

[10] D.24-05-064, RDF Row 10-11.

- **DT.3 –** Failure to administer a test-hole (pot-hole); or improper backfilling practices; or failure to maintain clearance; or other insufficient excavation practice: Company natural gas pipelines are at risk when an excavator fails to work safely around the buried facility. Failure to pothole can cause damage to natural gas pipelines, which could lead to one or many of the potential consequences listed below occurring.
- **DT.4** – Failure to maintain marks; or failure to support exposed facilities: Company natural gas pipelines are at risk when an excavator fails to work safely around the facilities. Failure to maintain marks or failure to support exposed facilities can cause damage to natural gas pipelines, which could lead to one or many of the potential consequences listed below occurring.
- **DT.5 –** Facility marking or location not sufficient; or facility was not located or marked: The Company, in some cases, may inaccurately mark facilities or fail to mark facilities due to incorrect operations, such as mapping/data inaccuracies, equipment signal interference, or human error. When this happens, third parties are not provided with accurate information on underground pipelines in the vicinity of excavations and the risk of damaging or rupturing gas pipelines increases, which could lead to one or many of the potential consequences listed below occurring.
- **DT.6 –** Incorrect facility records/maps: Updating of permanent mapping records could be delayed. This could result in underground infrastructure being incorrectly marked, which could lead to excavation damage. In addition, incorrect/inadequate asset records could result in underground infrastructure being incorrectly marked, which could lead to one or many of the potential consequences listed below occurring.
- **DT.7 –** Notification to One-Call Center made, but not sufficient; or wrong information provided to One-Call Center. Excavators such as contractors or property homeowners/tenants have requested an 811 USA ticket but are not knowledgeable about the details of the Dig Safe law may still damage underground facilities by performing some of the following practices:
    1. Excavating prior to the valid start date/time

2. Excavating after a valid ticket has expired
3. Excavating under another excavator's USA ticket
4. Improper job delineation and/or excavating beyond the delineation marks

These practices could lead to one or many of the potential consequences listed below occurring

- **DT.8 –** Other: Abandoned facility; or deteriorated facility; or previous damage or data not collected: Excavators such as contractors or property owners/tenants have requested an 811 USA ticket, the Company has responded to the request and an unknown abandoned facility is struck causing excavation damage. This may lead to an unexpected release of gas into the atmosphere. In addition, the requestor during their excavation process may come across a deteriorated facility or previous damage caused by some other entity. Each of these conditions present a risk that could lead to an unexpected release of gas, which could lead to one or many of the potential consequences listed below occurring.
- **DT**.**9** – Facility could not be found or located: The delay of updates to asset records/mapping, tracer wire issues, and equipment signal interference can present risk of an underground facility not being able to be located. If a known facility is unable to be located, the risk of an underground facility being damaged increases, which could lead to one or many of the potential consequences listed below occurring.
- **DT.10** – Other: One-Call Center Error: Includes mistakes made by the one call center (also known as 811 centers) during the process of managing excavation notifications. These errors can include issues such as incorrect information being provided to excavators, failure to relay accurate utility location data, or delays in processing requests, which could lead to one or many of the potential consequences listed below occurring.

D. Potential Consequences of Risk Event (CoRE)

Potential Consequences are listed to the right side of the risk Bow Tie. SoCalGas identifies the Potential Consequences of this risk by analyzing internal data sources, where

available, industry data, and subject matter expertise (SME).[11] These Bow Tie Consequences inform the CoRE component of the risk value. If one or more of the Drivers listed above were to result in an incident, the Potential Consequences, in a plausible worst-case scenario, could include:

- **PC. 1**: Serious injuries and/or fatalities;
- **PC. 2**: Property damage;
- **PC. 3:** Prolonged outages;
- **PC. 4:** Adverse litigation;
- **PC. 5:** Penalties and fines; and
- **PC. 6**: Erosion of public confidence.

These Potential Consequences were used by SoCalGas in the scoring of Excavation Damage during the development of SoCalGas's 2024 ERR.

E. Evolution of Risk Drivers and Consequences

As specified in the Phase 3 Decision,[12] the following changes to the previous ERR and/or the 2021 RAMP include:

1. Changes to Drivers/Triggers of the Risk Bow Tie

- DT.1 – Changed from "Excavators such as, contractors or property homeowners/tenants do not call 811 one-call center (USA) for locate and mark prior to excavation" to "No notification made to the One-Call Center"
- DT.2 – Changed from "Excavator fails to contact company 'standby' personnel to "Failure to use hand tools where required"
- DT.3 – Changed from "Hand excavation is not performed in the vicinity of located underground distribution facilities" to "Failure to test-hole (pot-hole); or improper backfilling practices; or failure to maintain clearances; or other insufficient excavation practices"

[11] D.24-05-064, RDF Row 10.

[12] *Id*., RDF Row 8.

- DT.4 – Changed from "Company does not respond to 811 requests in required timeframe" to "Failure to maintain marks; or failure to support exposed facilities"
- DT.5 – Changed from "Company does not "standby" when excavating near required facilities" to "Facility marking or location not sufficient; or facility was not located or marked"
- DT.6 – Changed from "Locator error contributing to the incorrect marking of underground distribution facilities" to "Incorrect facility records/maps"
- DT.7 – Changed from "Delayed updates to asset records of underground distribution facilities leading to incorrect locate and mark" to "Notification to One-Call Center made, but not sufficient; or wrong information provided to One Call Center"
- DT.8 – Changed from "Incorrect/inadequate information in existing asset records leading to incorrect locate and mark" to "Other: Abandoned facility; or deteriorated facility; or previous damage or data not collected"
- DT.9 – Changed from "Execution constraints" to "Facility could not be found or located"
- DT.10 – Added "Other: One-Call Center error"

2. Changes to Potential Consequences of the Risk Bow Tie

- No changes to potential consequences

F. Summary of Tranches

To determine groups of assets or systems with similar risk profiles, or Tranches, and in accordance with Row 14 of the RDF, SoCalGas applied the Homogeneous Tranching Methodology (HTM) as outlined in Chapter RAMP - 3: Risk Quantification Framework. As a result, the following classes, LoRE-CoRE pairs, and resulting number of Tranches were determined:

Table 1: Excavation Damage Risk
Tranche Identification

Class	Number of LoRE-CoRE Pairs	Number of Resulting Tranches
HP	117	29
MP	426	20
TOTAL	**543**	**49**

Attachment D illustrates the derivation of the Tranches, as shown in Table 1 above, in accordance with the HTM. The classes were identified by SoCalGas as logical groups of assets and systems based on the Company's operations. These classes also align risk treatments with asset risk profiles reflective of SoCalGas's operations. More detailed Tranche information, including risk quantification by LoRE-CoRE pair, Tranche names, and mitigation associations (*i.e.*, cost mapping and risk reduction) to Tranches, is provided in workpapers.

III. Pre Mitigation Risk Value

In accordance with the RDF Row 19, the table below provides the pre-mitigation risk values for the Excavation Damage Risk. Further details, including pre-mitigation risk values by Tranche, are provided workpapers. Explanations of the risk quantification methodology and other higher-level assumptions are provided in Chapter RAMP-3 Risk Quantification Framework.

Table 2: Excavation Damage Risk
Monetized Risk Values
(Direct, in 2024 $ millions)

LoRE	CoRE [Risk-Adjusted Attribute Values]			Total CoRE	Total Risk [LoRE x Total CoRE]
	Safety	Reliability	Financial		
3,312.62	$0.011	$0.008	$0.002	$0.021	$69.30

G. Pre Mitigation Risk Value Methodology

SoCalGas's risk modeling for the Excavation Damage risk follows RDF guidance[13] for implementing a Cost Benefit Approach, as described below:

[13] *Id.,* RDF Rows 2-7.

1. **Cost Benefit Approach Principle 1 – Attribute Hierarchy (RDF Row 2):** Excavation Damage risk is quantified in a combined attribute hierarchy as shown in Table 2 above, such that Safety, Reliability, and Financial are presented based on available, observable. and measurable data.
2. **Cost Benefit Approach Principle 2 – Measured Observations (RDF Row 3):** Excavation Damage risk features observable and measurable CoRE values. SoCalGas utilized its database of reportable excavation damage incidents data (mentioned in the introduction of this Chapter) to represent natural units for excavation damage events.
3. **Cost Benefit Approach Principle 3-Comparison (RDF Row 4):** Excavation Damage quantification did not include any attributes that are not directly measurable, so proxy data, as described in the RDF, was not necessary.
4. **Cost Benefit Approach Principle 4-Risk Assessment (RDF Row 5):** The data sources used for Excavation Damage – as described in the preceding paragraphs – were sufficient to model probability distributions for use in estimating risk values.
5. **Cost Benefit Approach Principle 5-Monetized Levels of Attributes (RDF Row 6):** In accordance with D.22-12-027 and D.24-05-064, RDF Row 6, SoCalGas and SDG&E used a California adjusted Department of Transportation monetized equivalent to calculate the Safety CoRE attribute at $16.2 million per fatality, $49 thousand for minor injuries, and $4.1 million per serious injury;[14] the Gas Reliability CoRE attribute is valued at a monetized equivalent of $3,868 per gas meter outage; and the Financial CoRE attribute is valued at $1 per dollar.[15] The Electric Reliability CoRE attribute is not considered for SoCalGas's Excavation Damage Risk.[16]

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[14] D.22-12-027 at 35 ("We adopt Staff's recommendation to require a dollar valuation of the Safety Attribute in the Cost Benefit Approach in the RDF using the DOT VSL as the standard value.").

[15] *See* Chapter RAMP-3: Risk Quantification Framework, Section II.

[16] Electric reliability CoRE is considered in SDG&E's Excavation Damage Risk.

Further information regarding SoCalGas's quantitative risk analyses, including raw data, calculations, and technical references, are provided in workpapers.

6. Cost Benefit Approach Principle 6-Adjusted Attribute Level (RDF Row 7):

Table 3: Excavation Damage Risk
Risk Scaled vs Unscaled Value by CoRE Attribute
(Direct, in 2024 $ millions)

	Safety	Reliability	Financial	Total
Unscaled Risk Value	$6.7	$22.6	$6.0	$35.3
Scaled Risk Value	$35.5	$27.3	$6.4	$69.3

The values in the table above are the result of SoCalGas applying the risk scaling methodology described in Chapter RAMP-3 to the CoRE attributes for Excavation Damage Risk. Excavation Damage Risk features significant risk aversion scaling due to the potential for high impact consequence outcomes resulting from excavation damage leading to an asset failure/uncontrolled release of gas.

For further information regarding the risk scaling function, including the risk scaling factor and the loss threshold at which the risk scaling factor begins to apply, is provided in Chapter RAMP-3, Risk Quantification Framework.

IV. 2024-2031 CONTROL & MITIGATION PLAN

This section identifies and describes the controls and mitigations comprising the portfolio of mitigations for Excavation Damage and reflects changes to the portfolio expected to occur from the last year of recorded costs at the time of filing this RAMP Report (2024) through the 2028 GRC cycle (2031). For clarity, a current activity that is included in the plan may be referred to as either a control and/or a mitigation. Table 4 below shows which control activities are in place in 2024 and which are expected to be ongoing, completed, or new during the 2025-2031 time periods. Because the TY 2024 GRC proceeding established rates through 2027,[17] information through 2027 is calculated as part of the baseline risk, in accordance with D.21-11-

[17] D.24-12-074.

009.[18] For the TY 2028 GRC, SoCalGas calculated CBRs beginning with TY 2028 and for each Post-Test Year 2029, 2030, and 2031.[19]

Table 4: Excavation Damage Risk
2024-2031 Control and Mitigation Plan Summary

ID	Control/Mitigation Description	2024 Control	2025-2031 Plan
C001	Damage Prevention Strategies	X	Ongoing
C002	Damage Prevention Activities	X	Ongoing
C003	Damage Prevention - Public Awareness	X	Ongoing
C004	Damage Prevention Mapping	X	Ongoing

A. Control Programs

In accordance with Commission guidance, this section "[d]escribe[s] the controls or mitigations currently in place"[20] (*i.e.,* activities in this section were in place as of December 31, 2024). Controls that will continue as part of the risk mitigation plan are identified in Table 4 above.

- **C001: Damage Prevention Strategies**: Damage Prevention Strategies is a program with a multifaceted approach to promote safe excavation practices and compliance with CA State Excavation Law 4216. The core components of this strategy include Engagement, Education, Enforcement, and Enhancements.
  Engagement: This component focuses on building collaborative relationships with excavators. By engaging directly with excavators in the field, the program provides an additional layer of communication and a point of contact. Face-to-face interactions make the process more personable, fostering open communication and cooperation. The goal is to create a proactive environment where safety and communication is prioritized.
  Education: Educating excavators on safe excavation practices and the specifics of CA State Excavation Law 4216 is a crucial part of damage prevention. This

[18] D.21-11-009 at 136 (Conclusion of Law (COL) 7) (providing a definition for "baselines" and "baseline risk").

[19] In the TY 2028 GRC, the last year of recorded costs, or base year, will be 2025. SoCalGas and SDG&E will forecast information for 2026 through 2031, in accordance with the Rate Case Plan.

[20] D.18-12-014 at 33.

component focuses on providing the necessary knowledge and resources to prevent damage and ensure compliance with legal requirements.

Key aspects of this education include:

- Instruction on the use of the 811 process: Explains how to use the 811 service to notify utility companies before digging, ensuring that underground utilities are marked and avoided.
- Proper delineation: Guidance on how to accurately mark the boundaries of the excavation site to prevent accidental damage to nearby utilities.
- Understanding utility markings: Assist excavators to interpret the markings provided by SoCalGas, which indicate the location, size and type of material of the underground utilities.
- Electronic positive response: Instruction on how to view electronic positive responses on the 811 One Call Center sites to confirm that utility companies have responded to the 811 notification and marked the utilities.
- High Priority Stand-By requirements: Explain the circumstances under which SoCalGas must have a representative on-site to ensure safe excavation around high priority facilities.

Enforcement: When incidents occur, enforcement is utilized as a corrective measure. This provides that violations are addressed promptly and that there are consequences for non-compliance, thereby reinforcing the importance of adhering to safety standards. The California Underground Safety Board (USB) is the enforcement authority that may levy fines and mandatory safety training for parties found to have violated the California digging law. Damage Prevention Strategies will impose a "stop the job" on sites where unsafe excavation activities are encountered. When negligent activities such as excavating without a valid 811 ticket result in excavation damage, Damage Prevention Strategies will submit a complaint to the Underground Safety Board for further investigation.

Enhancements: Continuous improvement is a key aspect of Damage Prevention Strategies. By reviewing collected data and industry best practices, the program utilizes this information to identify trends and implement enhancements to further promote safe excavation practices. Key enhancements include:

- Updates to the Ticket Risk Assessment Tool: This tool is refined based on new data and insights to better assess the risk associated with excavation tickets. By improving the accuracy and reliability of risk assessments, the program can more effectively prioritize and address potential hazards.
- Proactive patrolling of high-risk areas: Regular patrols are conducted in areas identified as high-risk based on historical data and current conditions. These patrols help to monitor ongoing excavation activities, provide immediate support, and prevent potential damages.
- Specific work type activities: The program focuses on activities that have recently caused excavation damages. By analyzing these incidents, Damage Prevention Strategies can develop targeted interventions and training to address the specific challenges associated with these work types.

Through these comprehensive approaches, Damage Prevention Strategies aims to mitigate risks, reduce excavation damages, and enhance the overall safety and efficiency of excavation activities. By continuously evolving and adapting to new information, the program ensures that it remains effective in promoting safe practices and compliance with CA State Excavation Law 4216.

- **C002: Damage Prevention Activities**: Damage Prevention Activities encompass a variety of approaches to promote the safety and integrity of subsurface facilities during excavation projects. To carry out these activities, the Company employs trained and qualified personnel to manage 811 ticket requests effectively, facilitating appropriate responses to each request. These responses may involve locating and marking subsurface facilities or confirming that no conflict exists in the proposed excavation area. Upon completion of each ticket, the Company provides an electronic positive response to the Regional One-Call Centers. This response allows excavators to see how the Company has addressed their requests, promoting transparency and communication. For high-priority subsurface facilities, the Company conducts stand-by activities when necessary. These stand-by activities provide additional oversight so that safe excavation practices are followed in close proximity to critical infrastructure, and any damages that occur

are promptly reported and corrected. In cases where subsurface facilities are challenging to locate, the Company utilizes potholing techniques to determine their location. This method enhances the accuracy of facility identification and contributes to overall excavation safety.

Also within this control are quality assurance activities, which are an integral function of damage prevention activities. These include random inspections of completed work, reviews of locate employees, verification of policy adherence, and follow-up with corrective actions when deviations are found. These measures promote compliance with Company policies and industry standards, with the goal of maintaining high levels of safety and reliability. Through these comprehensive damage prevention activities, the Company aims to minimize risks and promote the safe and efficient execution of excavation projects.

- **C003: Damage Prevention - Public Awareness**[21]: The Company is dedicated to raising public awareness about damage prevention through a series of strategic controls and enhancements. These efforts are designed to educate the public, promote safe practices, and reduce the risk of damage to subsurface facilities. Key components include:
  - **Compliance Monitoring**: The Company endeavors to adhere to industry guidelines and legal requirements for public education and outreach. Regular audits and reviews are conducted to assess compliance and identify areas for improvement.
  - **Public Education Campaigns**: The Company conducts ongoing public education campaigns to inform the community about the importance of safe excavation practices. These campaigns utilize various media channels, including social media, print, and broadcast, to reach a wide audience.

[21] In 2028 SB1371 costs associated with media and marketing campaigns (which began in 2020) will transfer to the TY2028 GRC Base O&M request.

- **Educational Materials**: The Company develops and distributes educational materials, such as brochures, flyers, and instructional videos, to provide clear and accessible information on safe excavation practices. These materials are made available at public events, community centers, and online.
- **Collaborative Partnerships**: The Company collaborates with local governments, industry associations, and other stakeholders to enhance public awareness efforts. These partnerships help amplify messaging around safe excavation practices and promote a coordinated approach to damage prevention.
- **Community Outreach Programs**: Through community outreach programs, the Company engages directly with local communities. These programs include workshops, seminars, and informational sessions that provide valuable insights into damage prevention and the use of 811 services.
- **Feedback and Improvement**: The Company actively seeks feedback through surveys and focus groups from the public and stakeholders to continuously improve its public awareness initiatives. This feedback is used to refine messaging, identify new outreach opportunities, and enhance the overall effectiveness of the program.

By implementing these controls and enhancements, the Company aims to foster a culture of safety and awareness, with the ultimate goal of reducing the risk of damage to subsurface facilities and promoting safer excavation practices.

- **C004: Damage Prevention Mapping**: The Company is committed to enhancing the mapping of subsurface facilities to promote accurate locate and mark responses, thereby reducing the risk of excavation damage. Several key controls and initiatives are in place to achieve this goal:
  - **Map Update Request Process**: When deviations are identified in the field, the Company uses a Map Update Request process to promptly update records. This promotes current and accurate mapping data.

- **GIS Data Quality Improvement Initiative**: This initiative leverages the synergy between GPS and GIS technologies to enhance record history. By integrating precise GPS data with GIS systems, the Company improves the accuracy and reliability of subsurface facility maps.
- **Anodes Connected to Tracer Wires**: To improve the signal received by locating underground equipment, anodes are connected to tracer wires. This enhances the effectiveness of locating subsurface facilities.
- **Pipeline Optical Cables**: For newly installed transmission pipelines, the Company uses pipeline optical cables. These cables provide additional data and monitoring capabilities, contributing to more accurate mapping and safer excavation practices.
- **Warning Mesh**: Installed above newly laid pipelines, warning mesh serves as a visual indicator to prevent accidental damage during excavation. This additional layer of protection helps so that subsurface facilities are not inadvertently disturbed.

Through these comprehensive controls and initiatives, the Company aims to continuously improve the quality of subsurface facility mapping, with the goal of promoting safer excavation practices and reducing the risk of damage.

B. Changes from 2024 Controls

SoCalGas plans to continue each of the existing controls discussed above, and reflected in Table 1, through the 2025-2031 period without any significant changes.

C. Mitigation Programs

SoCalGas does not currently foresee implementing new mitigations not described above during the 2025-2031 period.

D. Climate Change Adaptation

In assessing Excavation Damage, controls and/or mitigations that address climate adaptation planning were determined to be inapplicable (from the perspective of climate exposure, asset sensitivity, and asset adaptive capacity). A list of climate-relevant controls and mitigations is provided in Volume 1, Chapter RAMP-5: Climate Change Adaptation.

E. Foundational Programs

Foundational Programs are "[i]nitiatives that support or enable two or more Mitigation programs or two or more Risks but do not directly reduce the Consequences or reduce the Likelihood of safety Risk Events."[22] There are no activities for this risk that meet this definition of a foundational activity.

F. Estimates of Costs, Units, and Cost-Benefit Ratios (CBRs)

The tables in this section provide a quantitative summary of the risk control and mitigation plan for Excavation Damage, including the associated costs, units, and CBRs. Additional information by Tranche is provided in workpapers. The costs shown are estimated using assumptions provided by SMEs and available data. In compliance with the Phase 3 Decision,[23] for each enterprise risk SoCalGas uses actual results and industry data, and when that is not available, SoCalGas supplements the data with SME input. Additional details regarding the data and expertise relied upon in developing these estimates are provided in Attachment B.

Table 5: Excavation Damage Risk
Control and Mitigation Plan –Recorded and Forecast Costs Summary
(Direct, in 2024 $thousands)

ID	Control/Mitigation Name	Recorded Costs		Forecast Costs			
		2024 Capital	2024 O&M	2028 O&M	2025-2028 Capital	PTY Capital	PTY O&M
C001	Damage Prevention Strategies	0	1,391	1,391	0	0	6,893
C002	Damage Prevention Activities	0	29,355	31,632	0	0	98,604
C003	Damage Prevention – Public Awareness	0	2,904	3,991	0	0	11,973
C004	Damage Prevention Mapping	0	1,092	1,092	0	0	3,276

[22] D.24-05-064, Appendix A at A-4.

[23] D.24-05-064, RDF Row 10.

Table 6: Excavation Damage Risk
Risk Control & Mitigation Plan – Units Summary

Control/ Mitigation Name	Recorded Units*				Forecast Units*			
ID	**Name**	**Unit of Measure**	**2024 Capital**	**2024 O&M**	**2028 O&M**	**2025-2028 Capital**	**PTY Capital**	**PTY O&M**
C001	Damage Prevention Strategies	USA Tickets	0	1,032	1,032	0	0	3,097
C002	Damage Prevention Activities	USA Tickets	0	1,032	879	0	0	2,418
C003	Damage Prevention – Public Awareness	Communications sent	0	6,333	7,177	0	0	21,532
C004	Damage Prevention Mapping	USA Tickets	0	1,032	1,032	0	0	3,097

*Units shown in thousands

In the table below, CBRs are presented in summary at the mitigation or control level for the Test Year 2028 GRC cycle. CBRs are calculated based on scaled, expected values unless otherwise noted and are calculated for each of the three required discount rates[24] in each year of the GRC cycle and for the Post-Test Years in aggregate (2029-2031). Costs and CBRs for each year of the GRC cycle and the aggregated years are provided in workpapers.

[24] *See* Chapter RAMP-3: Medium Pressure Gas System for definitions of discount rates, as ordered in the Phase 3 Decision.

Table 7: Excavation Damage Risk
Cost Benefit Ratio Results Summary (2028-2031)
(Direct, in 2024 $millions)

ID	Control/Mitigation Name	Capital (2028 – 2031)	O&M (2028 – 2031)	CBR (Societal)	CBR (Hybrid)	CBR (WACC)
C001	**Damage Prevention Strategies**	0	8.3	1.91	2.04	1.91
C002	**Damage Prevention Activities**	0	130.2	18.23	19.49	18.28
C003	**Damage Prevention – Public Awareness**	0	16.0	0.82	0.88	0.83
C004	**Damage Prevention Mapping**	0	4.4	0.03	0.01	0.01

Bold *indicates a mandated program*

Please refer to the workpapers for Tranche-level CBRs by year and in aggregate for each mitigation are provided in workpapers.

V. ALTERNATIVE MITIGATIONS

Pursuant to D.14-12-025 and D.16-08-018,[25] SoCalGas considered two alternatives to the risk mitigation plan for the Excavation Damage Risk. The alternatives analysis for this plan considers changes in risk reduction, cost, reasonableness, current conditions, modifications to the plan and constraints, such as budget and resources.

Table 8: Excavation Damage Risk
Alternative Mitigation Plan –Forecast Costs Summary
(Direct, in 2024 $ millions)

ID	Alternative Mitigation Name	Forecast Costs			
		2025-2028 Capital	PTY Capital	2025-2028 O&M	PTY O&M
A001	MP Standby for Repeat Offenders	0	0	660.132	495.099
A002	Installation of non-required EFVs	0	0	6.360	4.770

[25] *See, e.g.,* D.18-12-014 at 33-35.

Table 9: Excavation Damage Risk
Alternative Mitigation Cost Benefit Ratio Results Summary
(Direct, in 2024 $ millions)

ID	Alternative Mitigation Name	Capital TY 2028	O&M TY 2028	CBR (Societal)	CBR (Hybrid)	CBR (WACC)
A001	MP Standby for Repeat Offenders	0	165.033	0.01	0.01	0.01
A002	Installation of non-required EFVs	0	1.590	0.04	0.02	0.02

A. Alternative 1: MP Stand-By Activities for Repeat Offenders

This alternative mitigation will require additional oversight on excavation damage repeat offenders (RO)[26] when excavating within 10 feet of company medium pressure substructures, when SoCalGas has been notified in advance. This would require company personnel to meet onsite with the RO to agree upon excavation activities prior to legal excavation start date and verify the RO is using appropriate excavation activities so that Company substructure is not damaged by the RO. This mitigation would mirror current California Code 4216.2c requirements for high priority subsurface installations.

By implementing this mitigation plan, the Company would aim to encourage responsible behavior among contractors and enhance safety standards. This approach not only promotes compliance but also fosters a collaborative relationship between the Company and excavators within the Company's service territory. The company has not included this mitigation as part of the control plan because it would not mitigate risks beyond a narrow group of excavators and yet the costs would be significant.

B. Alternative 2: EFV Installation

Per CFR 192.385, installation of manual service line shut-off valve (a "curb": valve or other manually operated valve) or an excess flow valve (EFV) are required on new or replaced service lines with meter capacity exceeding 1,000 Standard Cubic Foot Hours. This alternative mitigation would install EFVs on existing services that fall under the capacity requirements of CFR 192.385. By implementing this alternative mitigation plan, the Company aims to enhance the safety of its gas distribution system. The installation of EFVs on service lines will help prevent uncontrolled gas flow, reduce the risk of gas leaks, and protect both customers and

[26] Repeat Offender is defined as an excavator who has more than two damages on company substructures in a running 12-month period.

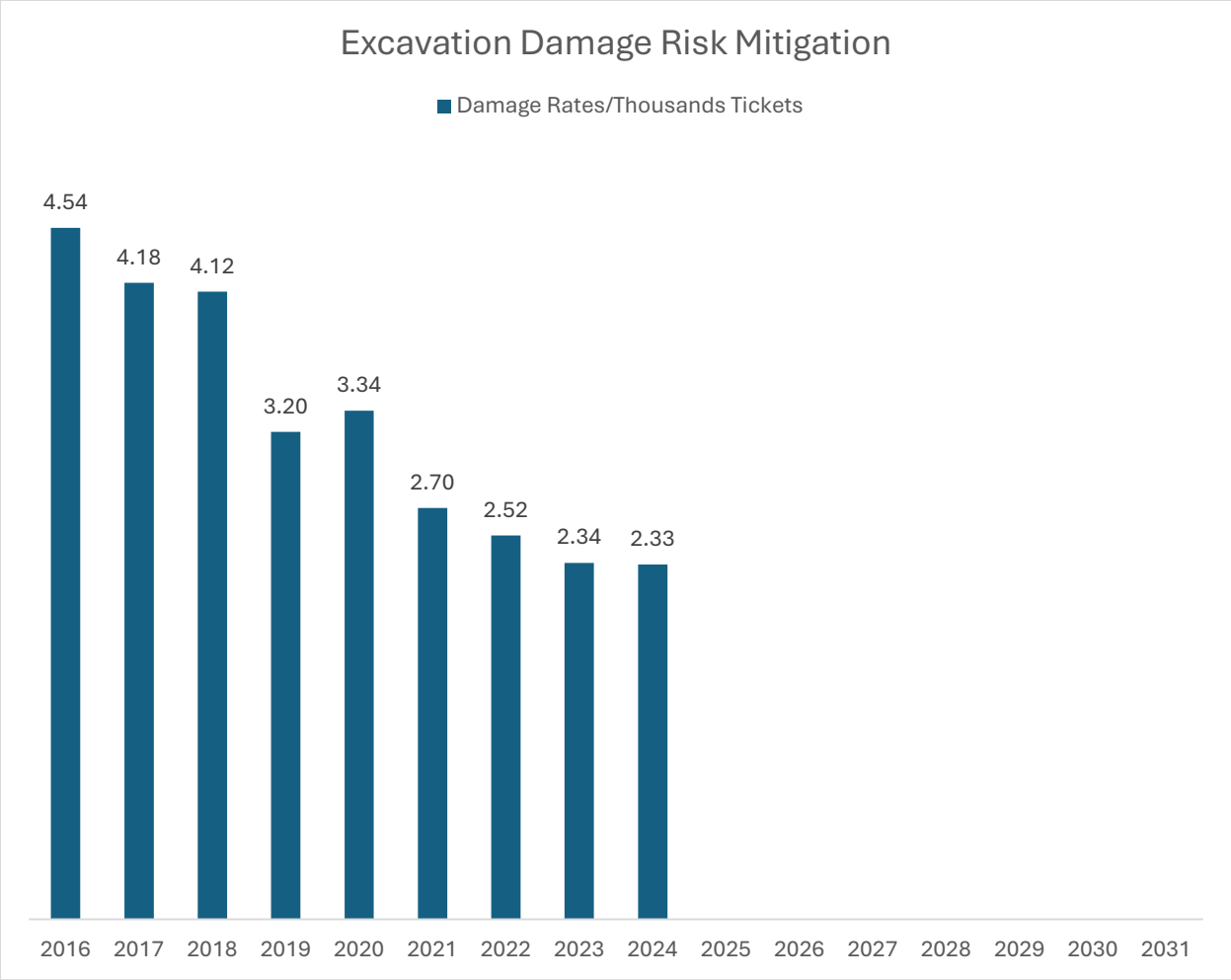
infrastructure. The Company has not included this mitigation as part of the control plan because the company is currently compliant with CFR 192.385 and additional in-depth analysis would be required to determine feasibility dependent on service line customer consumption and industry EFV technology.

VI. HISTORICAL GRAPHIC

As directed by the Commission in D.22-10-002, this section illustrates the accomplishments in safety work and the progress in mitigating safety risks over the two immediately preceding RAMP cycles. A bar chart graphic is employed to depict historical progress. This graphic uses a key metric that aligns with Company safety goals to illustrate trends in historical progress and identify remaining tasks necessary to continue mitigating risks.

Figure 4

Excavation Damage: Safety Progress 2016-2024



The historical safety work activities completed using the above metric from 2016-2024 include:

- 2019: Damage Prevention Strategies Program created to reduce excavation damages, educate excavation community on 811 requirements, and improve safe excavation. Create and maintain relationships with municipalities and excavators.
- 2019/2020: Ticket Risk Assessment (TRA) tool developed with continuance updates and retraining of model.
- 2020/2021 Collaborate with Public Awareness and Marketing/Communication teams to enhance the communication and awareness to the local communities of 811 and the importance of calling before digging.
- 2021: Repeat Offender Program initiated to identify and educate excavators who have more than 2 damages in a 12-month period.
- 2023: Partnership with PHMSA, CPUC and USB to develop a reporting platform for excavations caused by no notification made to 811.
- 2023: Launched 811 Ambassador Program to internal employees to report unsafe excavation activities.

The safety work that remains to be done is addressed the controls/mitigations detailed above in Section III. 2024-2031 Control & Mitigation Plan.

ATTACHMENTS

ATTACHMENT A

CONTROLS AND MITIGATIONS WITH REQUIRED COMPLIANCE DRIVERS

The table below indicates the compliance drivers which underpin identified controls and mitigations.

ID	Control/Mitigation Name	Compliance Driver
C001	Damage Prevention Strategies	PHMSA, CPUC GO-112F, California Gov Code 4216
C002	Damage Prevention Activities	49 CFR § 192, CPUC GO-112F, California Gov Code 4216
C003	Damage Prevention - Public Awareness	49 CFR § 192, CPUC GO-112F

ATTACHMENT B

EXCAVATION DAMAGE - REFERENCE MATERIAL FOR QUANTITATIVE ANALYSES

The Phase 3 Decision at RDF Row 10 and Row 29 directs each utility to identify Potential Consequences of a Risk Event using available and appropriate data.[27] Appropriate data may include Company specific data or industry data supplemented by the judgment of subject matter experts. Provided below is a listing of the inputs utilized as part of this assessment and the description of the data.

Excavation damage was modelled as a driver in both the medium pressure and high pressure risk models. For data sources used to model risk see Attachment B in the High Pressure Gas System and Medium Pressure Gas System risk chapters. Risk data unique to quantification of excavation damage risk is provided below.

Risk Data	**Source Type**	**Source Information**
Excavation damages by cause	Internal Data	Source: Internal data managed by the Gas System Integrity Department. Description: Data was used to quantify benefits to controls and mitigation that address specific causes of excavation damage, such as locate and mark or mapping issues.
Excavation damages from repeat offenders	Internal Data	Source: Internal data managed by the Gas System Integrity Department. Description: Data was used to quantify damages caused by repeat offenders for benefits calculation.

[27] D.24-05-064, RDF Row 10 and Row 29.

ATTACHMENT C

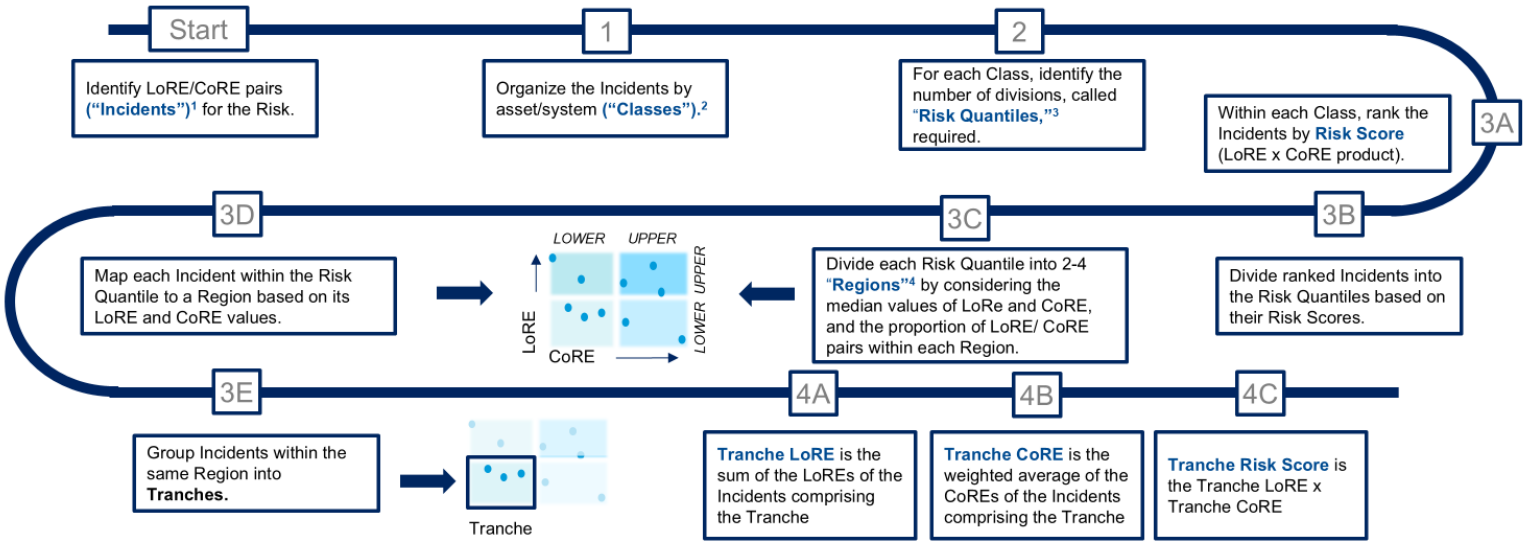
EXCAVATION DAMAGE - SUMMARY OF ELEMENTS OF BOW TIE

SUMMARY OF ELEMENTS OF BOW TIE			
ID	**Control/Mitigation Name**	**Drivers Addressed**	**Consequences Addressed**
C001	Damage Prevention Strategies	1, 2, 3, 4, 7, 10	1, 2, 3, 4, 5, 6
C002	Damage Prevention Activities	5, 6, 8, 9	1, 2, 3, 4, 5, 6
C003	Damage Prevention - Public Awareness	1, 2, 3	1, 2, 3, 4, 5, 6
C004	Damage Prevention Mapping	6, 8, 9	1, 2, 3, 4, 5, 6

ATTACHMENT D

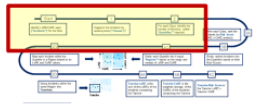
APPLICATION OF TRANCHING METHODOLOGY

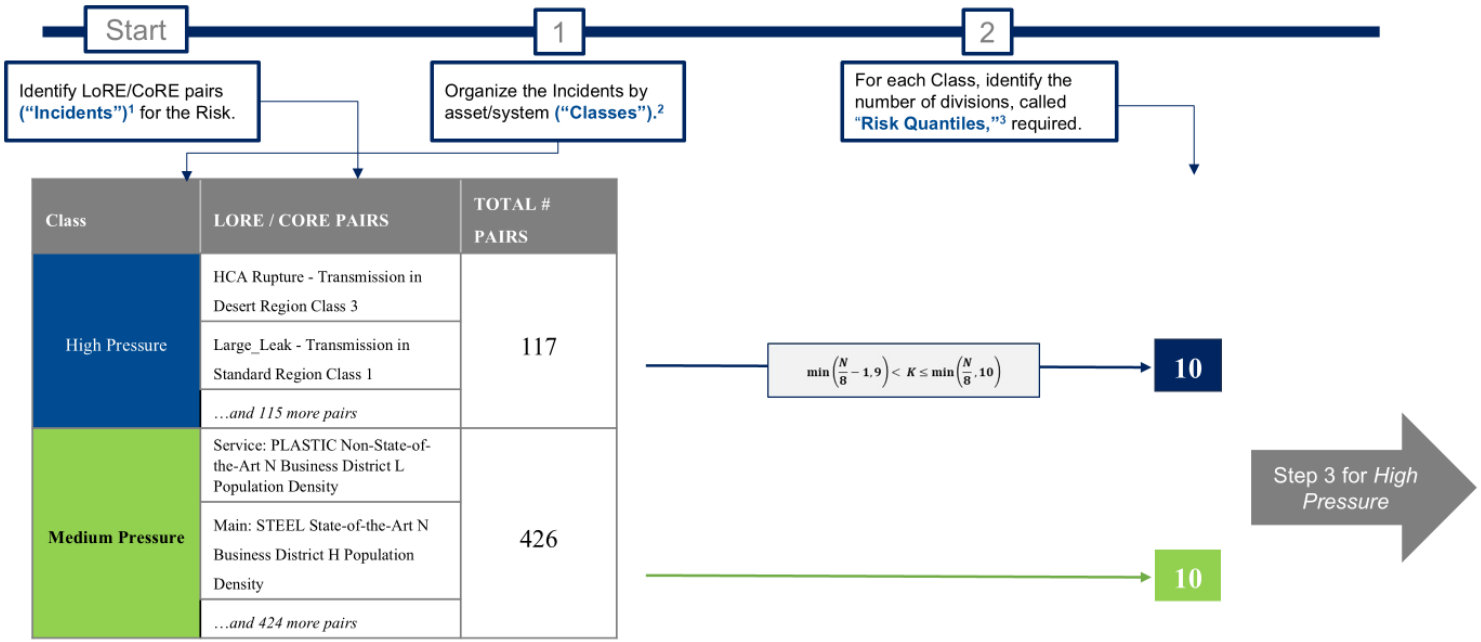
A sample walkthrough of the Homogeneous Tranching Methodology (HTM) as outlined in Volume 1, Chapter RAMP - 3: Risk Quantification Framework is provided.



NOTES

[1]*For example, **Incidents (or "Risk Incidents")** for Excavation Damage these include leaks or damages cause by dig ins.*
[2]*For example, **Classes (or "Asset Classes")** for Excavation Damage these include High or Medium pressure pipe.*
[3]***Quantiles** are divisions of equal numbers of incidents (quartiles have 4 divisions, quintiles have 5, etc.) The number of incidents dictates the number of quantiles needed.*
[4]*The four **Regions** are: 1. Lower LoRE-Lower CoRE (LL-LC), 2. Lower LoRE-Upper CoRE (LL-UC), 3. Upper LoRE-Lower CoRE (UL-LC), and 4. Upper LoRE-Upper CoRE (UL-UC).*




Start
1
2
Identify LoRE/CoRE pairs ("Incidents")[1] for the Risk.
Organize the Incidents by asset/system ("Classes").[2]
For each Class, identify the number of divisions, called "Risk Quantiles,"[3] required.
Class
LORE / CORE PAIRS
TOTAL # PAIRS
High Pressure
HCA Rupture - Transmission in Desert Region Class 3
Large_Leak - Transmission in Standard Region Class 1
…and 115 more pairs
117
Medium Pressure
Service: PLASTIC Non-State-of-the-Art N Business District L Population Density
Main: STEEL State-of-the-Art N Business District H Population Density
…and 424 more pairs
426
$\min\left(\frac{N}{8}-1,9\right) < K \leq \min\left(\frac{N}{8},10\right)$
10
10
Step 3 for High Pressure

Within each Class, rank the Incidents by **Risk Score** (LoRE x CoRE product). 3A

3B

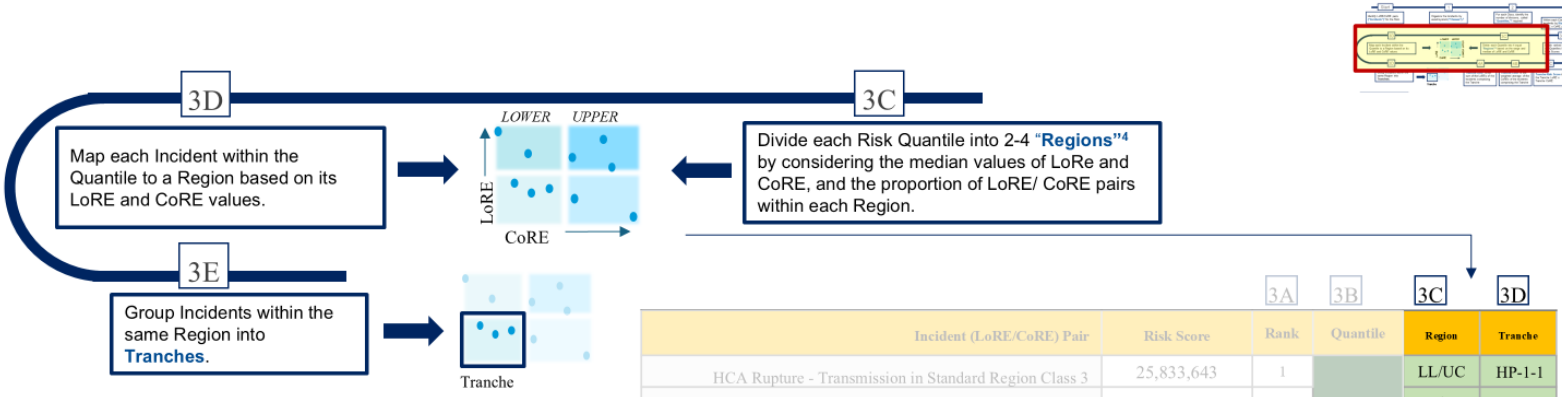
Divide ranked Incidents into the Risk Quantiles based on their Risk Scores.

6

From Step 2 for *High Pressure*

3A 3B

Incident (LoRE/CoRE) Pair	Risk Score	Rank	Risk Quantile
HCA Rupture - Transmission in Standard Region Class 3	25,833,643	1	#1
HCA Rupture - Transmission in Standard Region Class 4	3,273,125	2	
Rupture - Transmission in Standard Region Class 1	2,069,546	3	
HCA Rupture - Transmission in Standard Region Class 3	2,054,531	4	
HCA Rupture - Transmission in Desert Region Class 3	1,204,763	5	
Large_Leak - Transmission in Standard Region Class 1	917,853	6	
Rupture - Transmission in Standard Region Class 1	840,260	7	
Rupture - Transmission in Desert Region Class 1	720,080	8	
Rupture - High_Pressure_Distribution in Region Zone 3	578,915	9	
Large_Leak - Transmission in Standard Region Class 1	347,685	10	
HCA Rupture - Transmission in Standard Region Class 4	257,011	11	
Rupture - High_Pressure_Distribution in Region Zone 4	239,796	12	
Small_Leak - High_Pressure_Distribution in Region Zone 3	224,570	13	#2
Large_Leak - Transmission in Desert Region Class 1	187,332	14	
MCA Rupture - Transmission in Standard Region Class 1	148,876	15	
HCA Large_Leak - Transmission in Standard Region Class 3	144,640	16	
...	...	17-117	



		3A	3B	3C	3D
Incident (LoRE/CoRE) Pair	Risk Score	Rank	Quantile	Region	Tranche
HCA Rupture - Transmission in Standard Region Class 3	25,833,643	1	#1	LL/UC	HP-1-1
HCA Rupture - Transmission in Standard Region Class 4	3,273,125	2		LL/UC	HP-1-1
Rupture - Transmission in Standard Region Class 1	2,069,546	3		UL/LC	HP-1-2
HCA Rupture - Transmission in Standard Region Class 3	2,054,531	4		LL/UC	HP-1-1
HCA Rupture - Transmission in Desert Region Class 3	1,204,763	5		LL/UC	HP-1-1
Large_Leak - Transmission in Standard Region Class 1	917,853	6		UL/LC	HP-1-2
Rupture - Transmission in Standard Region Class 1	840,260	7		UL/LC	HP-1-2
Rupture - Transmission in Desert Region Class 1	720,080	8		UL/LC	HP-1-2
Rupture - High_Pressure_Distribution in_Region Zone 3	578,915	9		UL/LC	HP-1-2
Large_Leak - Transmission in Standard Region Class 1	347,685	10		UL/LC	HP-1-2
HCA Rupture - Transmission in Standard Region Class 4	257,011	11		LL/UC	HP-1-1
Rupture - High_Pressure_Distribution in_Region Zone 4	239,796	12		LL/UC	HP-1-1
Small_Leak - High_Pressure_Distribution in_Region Zone 3	224,570	13	#2	UL/LC	HP-2-3
Large_Leak - Transmission in Desert Region Class 1	187,332	14		UL/LC	HP-2-3
MCA Rupture - Transmission in Standard Region Class 1	148,876	15		UL/UC	HP-2-5
HCA Large_Leak - Transmission in Standard Region Class 3	144,640	16		UL/UC	HP-2-5
…	…	17-117	…	…	

4A

Tranche LoRE is the sum of the LoREs of the Incidents comprising the Tranche

4B

Tranche CoRE is the weighted average of the CoREs of the Incidents comprising the Tranche

4C

Tranche Risk Score is the Tranche LoRE x Tranche CoRE

		4A	4B	4C
Incident (LoRE/CoRE) Pair	**Tranche**	**Tranche LoRE**	**Tranche CoRE**	**Tranche Risk Score**
HCA Rupture - Transmission in Standard Region Class 3	HP-1-1	0.022	$1,516,320,724	$32,862,869
HCA Rupture - Transmission in Standard Region Class 4	HP-1-1			
HCA Rupture - Transmission in Standard Region Class 3	HP-1-1			
HCA Rupture - Transmission in Desert Region Class 3	HP-1-1			
HCA Rupture - Transmission in Standard Region Class 4	HP-1-1			
Rupture - High_Pressure_Distribution in_Region Zone 4	HP-1-1			
Rupture - Transmission in Standard Region Class 1	HP-1-2	0.301	$18,209,241	$5,474,339
Large_Leak - Transmission in Standard Region Class 1	HP-1-2			
Rupture - Transmission in Standard Region Class 1	HP-1-2			
Rupture - Transmission in Desert Region Class 1	HP-1-2			
Rupture - High_Pressure_Distribution in_Region Zone 3	HP-1-2			
Large_Leak - Transmission in Standard Region Class 1	HP-1-2			
Small_Leak - High_Pressure_Distribution in_Region Zone 3	HP-2-3	1.776	$419,689	$45,349
Large_Leak - Transmission in Desert Region Class 1	HP-2-3			
MCA Rupture - Transmission in Standard Region Class 1	HP-2-5	0.019	$15,386,473	$293,516
HCA Large_Leak - Transmission in Standard Region Class 3	HP-2-5			