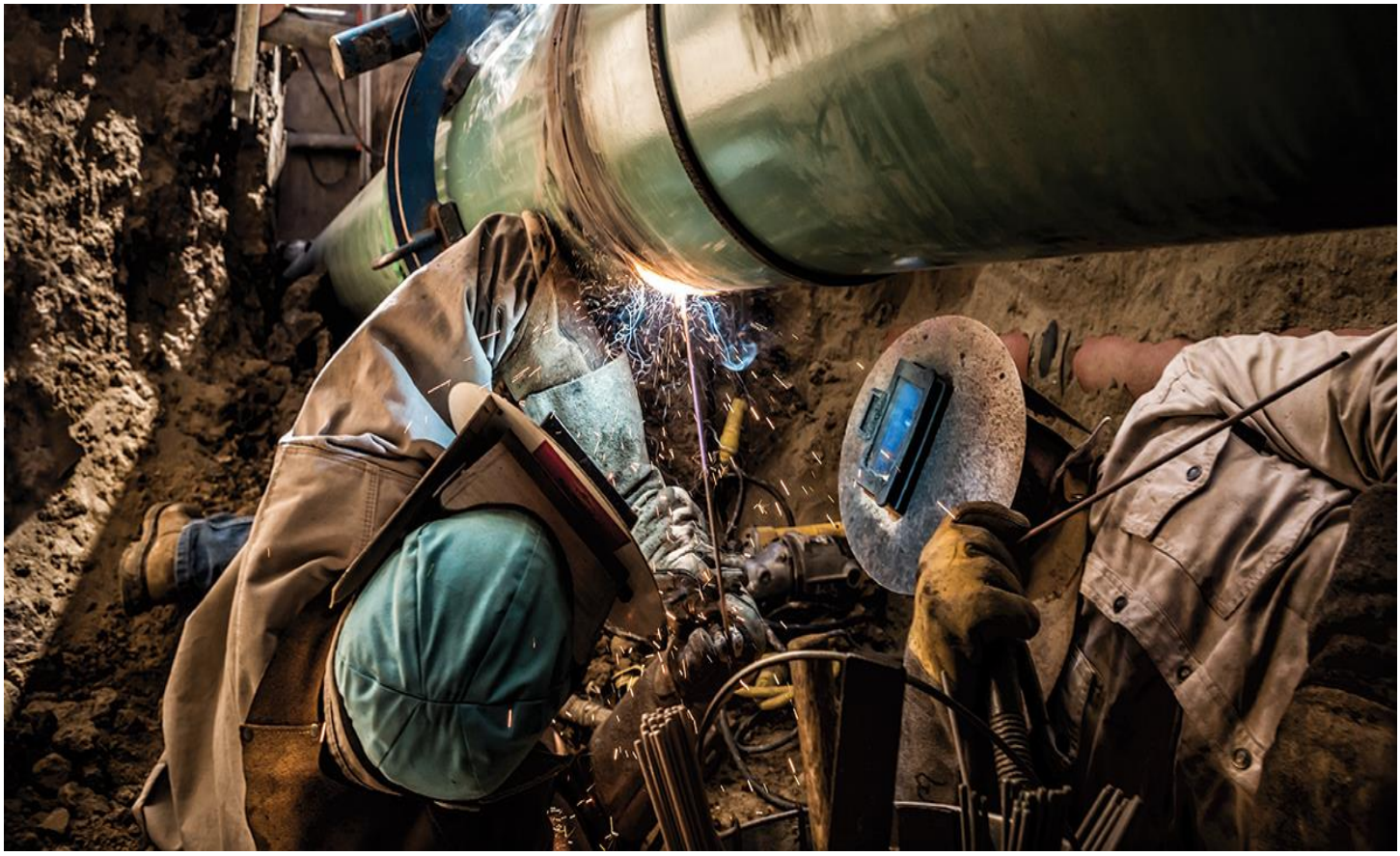
Pacific Gas and Electric Company®

2023 GAS SAFETY PLAN



March 15, 2023

Dear Reader,

PG&E has a fundamental responsibility to design, build, maintain, and operate our gas systems to keep customers and communities safe. The 2023 Gas Safety Plan ("Plan")[1] provides a high-level view of the work we accomplished in 2022 and strives to present important Gas Operations information in a manner that is accessible and clear to a broad audience.

PG&E's 2023 Gas Safety Plan includes aspects that are new since the 2022 Plan. First, in the PG&E Goals section, PG&E has implemented a new process for goal setting including creating a Plan on a Page (POP) for each functional area within Gas. A Plan on a Page outlines the strategic goals and initiatives for the year which focus on safety, quality, delivery, cost, and morale. In Workforce Safety, PG&E introduced the Blackline Safety Worker monitoring devices which allow vulnerable coworkers to send distress calls which immediately notify emergency response resources. In the Risk Management section, PG&E describes the new cost-benefit approach which standardizes dollar valuations of safety, electric reliability, and gas reliability consequences from risk events. Last, in the Continuous Improvement section, PG&E introduces its new Electric and Gas Performance and Process Improvement team.

The Plan also include updates on items discussed in previous Gas Safety Plans. First, in the Public Safety section, PG&E states it achieved a 0.87 third-party dig-in rate per 1,000 Underground Service Alert (USA) tickets. This is PG&E's lowest third-party dig-in rate since PG&E has tracked this metric starting in 2010. In the Safety Culture section, PG&E describes how through the Industrial Athlete Specialist program, PG&E has implemented measures resulting in dramatic reductions of additional worker's compensation claims within six months of the coworker's initial claim. Next, in the Distribution Mains and Services section, PG&E communicates the closure letter from the NTSB regarding the 2019 third-party strike and fire in San Francisco. Last, in the Records and Information Management section, PG&E states Gas Transmission Remedy E.07 associated with the analysis and mitigation of Gas Operations shared drives was closed in December 2022.

While we have made progress in key safety areas, we realize there is more to do to demonstrate our commitment and progress towards Gas Safety Excellence. PG&E experienced two Serious Injury and Fatality Actuals (SIF-As) resulting in coworker fatalities in 2022. To reduce the number of Serious Injury and Fatality Potentials (SIF-Ps) and Serious Injury and Fatality Actuals (SIF-As), PG&E's Gas Safety Improvement Strategy will be focused on reinforcing human performance standards (examples include, but not limited to, three-way communication, job hazard analysis, and step-by-step place keeping for critical operational tasks), emphasizing the importance of the 10 Keys to Life (high-risk work tasks), and building the capacity to fail safe into our high-risk work activities. PG&E remains focused and dedicated to ensuring everyone and everything is always safe.

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[1] PG&E submits this plan in accordance with General Order 112-F Section 123.2(k), and Public Utilities Code §§961 and 963.

PACIFIC GAS AND ELECTRIC COMPANY
GAS SAFETY PLAN

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I. INTRODUCTION

Pacific Gas and Electric Company (PG&E or the Company or the Utility) works every day to safely transport natural gas under pressure through approximately 6,500 miles of transmission pipelines, 43,700 miles of gas distribution pipelines, 4.7 million customer meters, over 4,000 transmission and distribution (T&D) regulator stations, nine compressor stations, and three gas storage facilities. The PG&E natural gas system serves millions of Californians from Eureka in the North to Bakersfield in the South, and from the Pacific Ocean in the west to the Sierra Nevada in the east. PG&E's employees work around the clock, 365 days a year to provide reliable service and to keep everyone and everything always safe.

PG&E's Gas Safety Plan (Plan) provides a view into the safety activities PG&E pursues every day and highlights the specific gas safety work in 2022. PG&E annually reviews and updates its Plan in accordance with General Order 112-F Section 123.2(k), and Public Utilities Code (Pub. Util. Code) Sections 961 and 963.[1] Figure 1, on the following page, provides a summary of PG&E's performance in key areas.

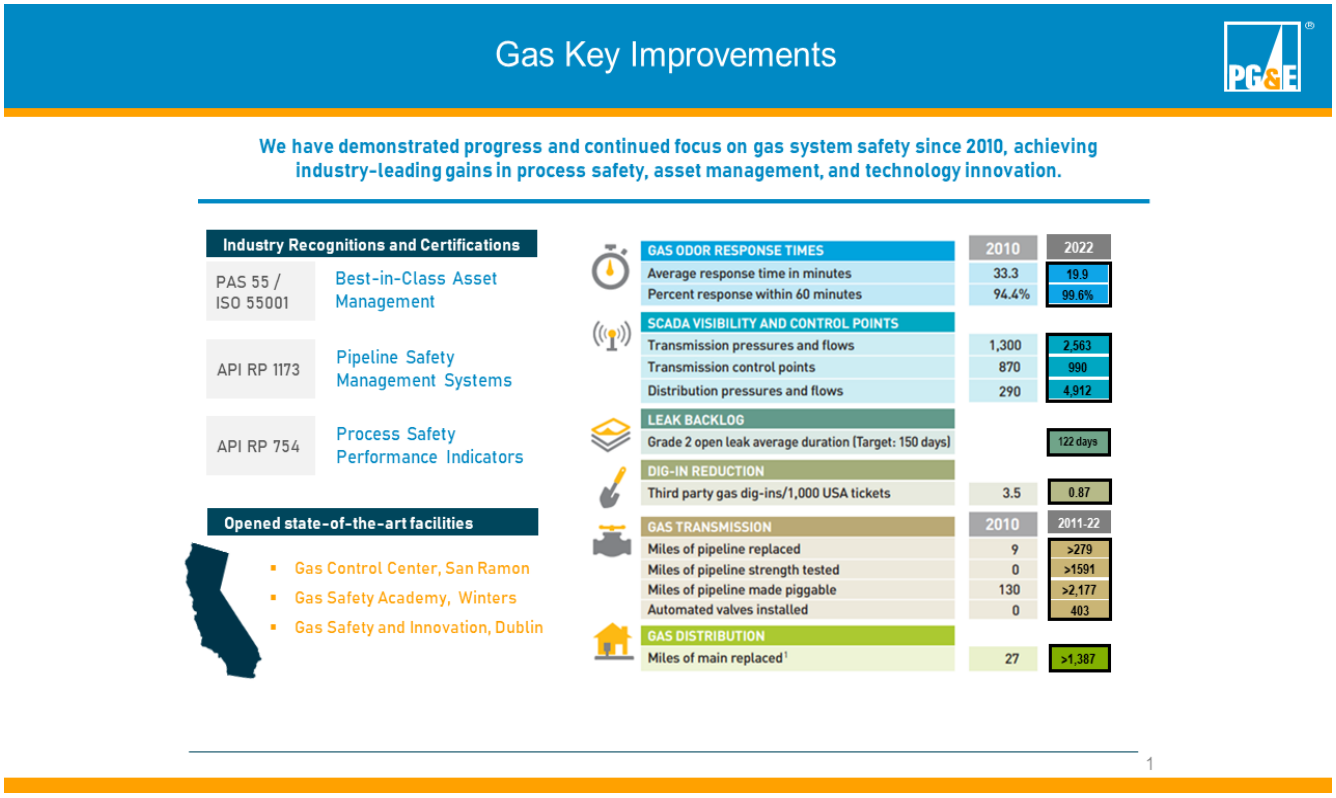


Figure 1 – Gas Key Improvements

1. STRUCTURE OF THE GAS SAFETY PLAN

The 2023 Plan reports the details associated with the work performed in 2022 to keep everyone and everything always safe. In alignment with California's regulatory framework,[2] this Plan explains how PG&E puts the safety of the public, customers, employees and contractors first, and how the Company has made safety investments in processes and infrastructure that are consistent with best practices in the gas industry.

The following sections of the Plan provide more information on how PG&E is achieving Gas Safety Excellence and include updates on the Company's safety goals and commitments to public, customer, employee, and contractor safety.

- **Gas Safety Excellence Management System (GSEMS):** PG&E's integrated safety management system provides the framework and structure to drive operational excellence and safety and reliability performance across the organization.
- **Safety Culture:** This section highlights how PG&E is working to improve workforce safety through building a culture focused on the hearts and minds of our employees and building a deeper partnership between Gas leadership, Grassroots Safety Teams, and the Labor Unions.
- **Process Safety:** This section focuses on PG&E's efforts to prevent low frequency, high consequence incidents, and mitigating the consequences from these incidents.
- **Asset Management:** This section expresses how PG&E utilizes the Asset Management System and concepts of Publicly Available Specification (PAS) 55: 2008 and International Organization for Standardization (ISO) 55001: 2014 to focus on the safety of our gas system assets. Concepts include: knowing the condition of the assets, understanding the risks to those assets, implementing asset risk reduction strategies, maintaining asset condition and performance, and balancing asset cost, risk, and performance in pursuit of the asset management strategic objectives.
- **Workforce and Compliance Framework:** This section reviews how PG&E qualifies, trains, and engages the workforce to mitigate risk by working on assets safely and performing work correctly. These sections include information about PG&E's workforce training and qualification programs and how PG&E achieves compliance.
- **Continuous Improvement (CI):** This section presents PG&E's efforts to continuously improve processes and procedures.

2. GAS SAFETY EXCELLENCE MANAGEMENT SYSTEM

Gas Safety Excellence is demonstrated by:

- Putting ***SAFETY*** and people at the heart of everything.
- Investing in the ***RELIABILITY*** and integrity of PG&E's gas system.
- Continuously improving the effectiveness and ***AFFORDABILITY*** of PG&E's processes
- Supporting emissions reduction and working to advance PG&E's comprehensive ***CLEAN*** energy goals.

Figure 2 – PG&E Gas Safety Excellence Management System

The journey to implement the Gas Safety Excellence Management System began in 2012 with the establishment of the Gas Safety Excellence framework. Supported by the pillars of Asset Management, Safety Culture, and Process Safety, the framework enabled Gas to establish processes and controls to systematically reduce risk and improve safety. It also required periodic leadership review of the safety management system to assure continued effectiveness and maturity.

Certification of the Gas Safety Excellence Management System for compliance with best-in-class industry standards by an independent third-party auditor began in 2014. In 2022, PG&E's GSEMS remained certified as compliant to the requirements of the following industry standards:

- PAS 55/ISO 5001-Asset Management System Requirements for Asset Management;
- API RP 1173 Pipeline Safety Management System for Safety Culture; and
- API RP 754 Process Safety Performance Indicators.

In 2018, the GSEMS manual was published. The GSEMS manual integrated the requirements of the three pillars into one management system consisting of 16 elements to improve assessment of system maturity and effectiveness.

GSEMS elements establish requirements to address risks inherent to Gas and provide a model to systematically manage governance, policies, processes, and procedures. It also requires continual reviews to assure the system is working as intended. GSEMS consists of the following sixteen interrelated elements:

1. Leadership Commitment, Accountability and Employee Participation;
2. Asset Management and Life Cycle Planning;
3. Risk Assessment and Management;
4. Incident Investigation and Corrective Action(s);
5. Compliance with Legal, Regulatory and other Operational Requirements;

6. Operational Planning and Control(s);
7. Communication and Stakeholder Engagement;
8. Information, Documentation and Records Management;
9. Contractor Management and Third-Party Services;
10. Training, Competency and Awareness;
11. Management of Change;
12. Monitoring and Measurement; and
13. Emergency Preparedness and Response.

In 2019, PG&E began to conduct biennial assessments of system maturity. These internal assessments have identified over 100 opportunities to improve system maturity. Figure 3 shows the results of the 2019 and 2021 biennial assessments by system element. The next maturity assessment cycle is in 2023.

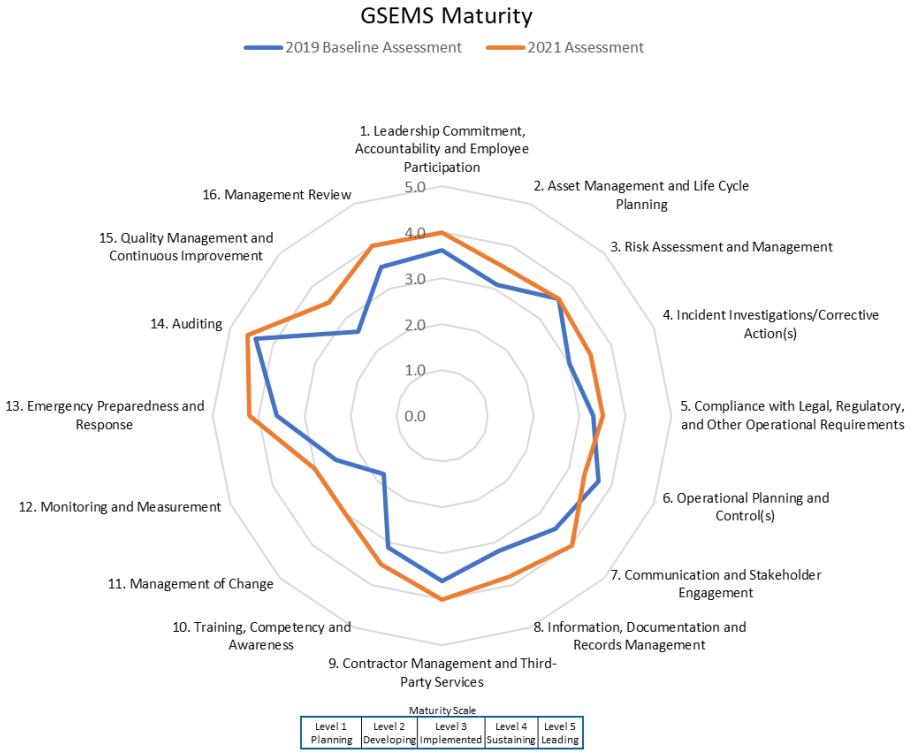


Figure 3 – Maturity Assessment Chart 2019 & 2021

3. PG&E's True North Strategy

a) PG&E's Goals

In 2022, Gas followed the Company's new business plan deployment model to set goals and initiatives for 2023. This process incorporates the Company's True North Strategy to create functional area Plans on a Page that outline the strategic goals and initiatives for the year. Gas' Plans on a Page (POP) include both operational and engineering activities that align with the Company's focus areas: Safety, Quality, Delivery, Cost, and Morale. This process results in a full plan on a page that drives action throughout the business. Related goals and metrics cascade throughout the organization to provide each coworker a line of sight to how their daily activities support PG&E's True North Strategy.

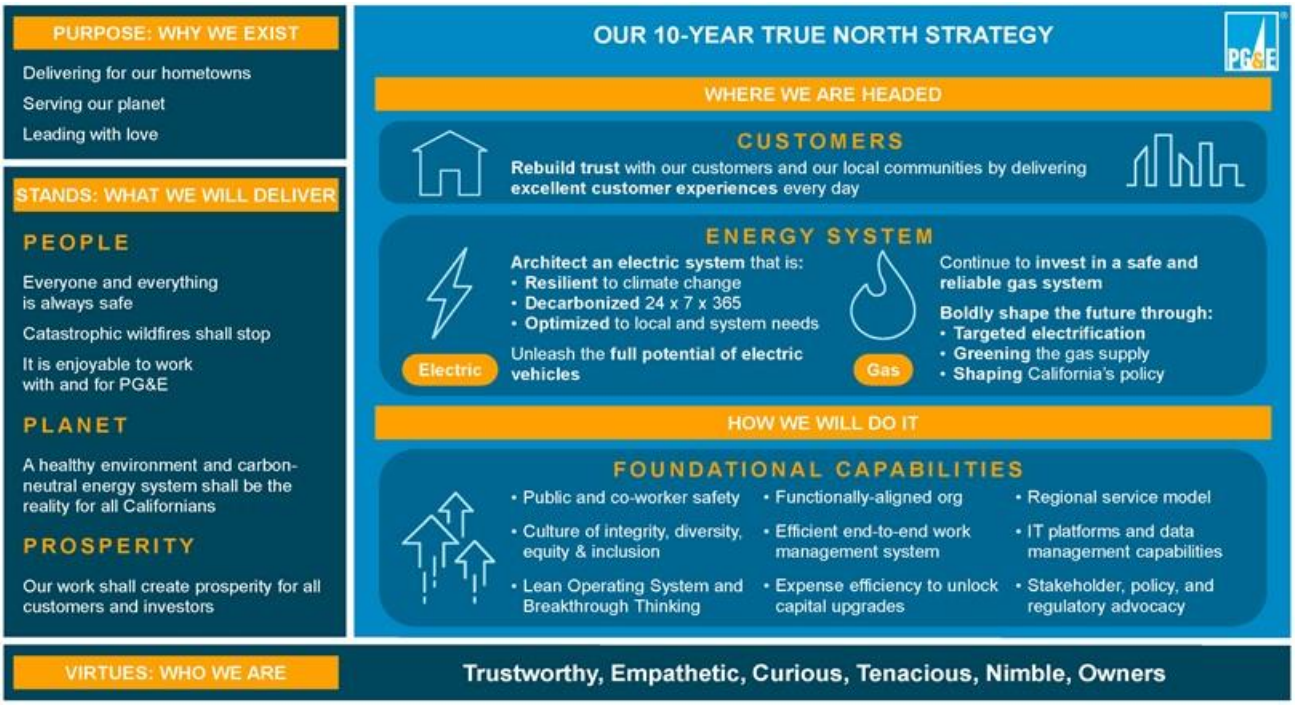


Figure 4 – PG&E's True North Strategy

4. Public Safety

As mentioned in the Introduction and shown in Figure 1, PG&E continues to make progress and improvements to support the safe operation of the gas system. Three areas of continued focus to improve public safety are: In-Line Inspections, Third Party Dig-ins and Gas Emergency Response.

- **In-Line Inspections:** In 2022, PG&E increased piggability from 45 percent to roughly 49 percent of the approximately 6,500 miles of the Gas Transmission system.
- **Third-Party Dig-Ins:** In 2022, PG&E experienced 0.87 third-party dig-ins per 1,000 Underground Service Alert (USA) tickets, outperforming its 2022 target of 0.92 third-party dig-ins per

1,000 tickets. This is PG&E's lowest third-party dig-in rate since PG&E began tracking this metric in 2010.

- **Gas Emergency Response**: In 2022, PG&E's average response time for immediate response gas odor or gas leak calls was 19.9 minutes, exceeding the target of 20.5 minutes.

5. Workforce Safety

PG&E's goal is to continually reduce risk to keep our customers, our communities, and our workforce (employees and contractors) safe. Our focus is to continue building an organization in which we have designed every work activity to facilitate safe performance, every member of our workforce knows and practices safe behaviors, and every individual is encouraged to speak up if they see unsafe or risk behavior and has confidence that all concerns and ideas will be heard and follow up action will be taken.

The Gas team continued the focus on the 2025 Workforce Safety Strategy that includes two major pillars: systems and culture. Systems refers to risk management, equipment, processes, and procedures. Culture refers to employee engagement, adherence to established requirements, sense of urgency for safety, and leadership.

PG&E aspires to eliminate workplace fatalities and reduce the number of serious safety incidents. PG&E established Days Away, Restricted or Transferred (DART) targets for 2022 to achieve a reduction from 2021. In 2022, Gas had 69 DART cases at a rate of 1.46. In 2022, this was a reduction of 22 cases and a rate reduction of 0.46 from 2021. The top three DART injuries were Sprain/Strain, Musculoskeletal, and cut/laceration related. Gas completed a Common Cause Evaluation of 153 Sprain/Strain and MSD incidents that occurred from Jan 1, 2020 – March 31, 2021. As a result of the review, we identified 5 Corrective Actions from the CCE, with the last CA in 2022 to improve focus on top injury drivers and improve communication and use of available preventative resources. In 2022, there were 90 CAPs submitted related to Sprains and Strains Injuries. Gas employees were involved in 30 Lost Time Injuries in 2022, which was an increase of two from 2021. In 2022, the California Occupational Safety and Health Administration (OSHA) recordable rate decreased by approximately 13.1 percent from 3.16 percent to 2.78 percent. This is a result of early intervention at the first sign of discomfort, PG&E's 24 hour, seven days a week Nurse Care Line (NCL), early reporting, and Industrial Athlete (IA) utilization. In 2022, 92.8 percent of employees who called the NCL reported discomfort or an injury within 24 hours, which was a 14.4 percent increase from 2021. Based on the data, PG&E believes that encouraging employees to speak to healthcare professionals about injuries or illnesses within 24 hours contributes to reduced severity and recovery time of injuries or illnesses. Through consistent application of timely reporting and preventative efforts, the serious Lost Time Injuries have begun to follow the OSHA recordable curve and shows improvement.

In 2022, Gas had nine safety incidents with Serious Injury and Fatality Potential (SIF-P) and two Serious Injury and Fatality Actuals (SIF-A). Of the nine SIF-Ps, five of the incidents were work-related, and four of

the incidents are motor vehicle related. One SIF-A was related to line of fire hazards and lockout tag-out procedures, and the other was related to mobile equipment operations and struck-by hazards. To reduce the number of SIF-Ps and SIF-As, PG&E's Gas Safety Improvement Strategy will be focused on reinforcing human performance standards (examples include, but are not limited to, three-way communication, job hazard analysis, and step-by-step place keeping for critical operational tasks), emphasizing the importance of the 10 Keys to Life (high-risk work tasks), and building the capacity to fail safe into our high-risk work activities. A SIF review team, composed of department representatives and enterprise safety, evaluates all injuries and near hits for SIF potenital. PG&E continued its adoption in 2022 of Edison Electric International's (EEI) Safety Classification Learning Model (SCL) to classify its serious injury or fatality (SIF) incidents. The EEI SCL model classifies incidents into categories: High-Energy SIF (HSIF), Low-Energy SIF (LSIF), Potential SIF (PSIF), Capacity, Exposure, Success & Low Severity. Adopting the EEI SCL Model has improved the SIF program by bringing a consistent and objective approach to reviewing, classifying, and deploying corrective actions to prevent reccurence of SIF incidents across the company and industry.

Once an incident is determined to meet SIF criteria, a cause evaluation team is assembled to investigate the facts of the incident, and identify the causal and contributing factors. The team also develops comprehensive corrective actions to minimize and/or prevent reoccurence. Upon completion of the internal investigation, a written report is presented to the Corrective Action Review Board to evaluate and accept the corrective actions. The Corrective Action Review Board is comprised of Gas Leaders, Gas CAP Leaders, and Enterprise Health and Safety (EH&S) Leaders. Once approved, the corrective actions are entered into CAP and tracked and monitored to completion. Following closure of all corrective actions, an effectiveness review is conducted to determine if the actions taken were effective in preventing or mitigating the original outcome.

PG&E continued additional evaluation measures in 2022, such as Timely Corrective Action Completion and Quality of Corrective Actions, to focus on both the quality and timely closure of corrective actions from SIF investigations. In 2022, Gas completed 100 percent of the corrective actions in a timely manner. This is an increase of 18 percent from the prior year.

Another area of focus continues to be Motor Vehicle Safety. In 2022, there were four Serious Preventable Motor Vehicle Incidents (SPMVI). In 2017, the Company installed an in-cab coaching technology in over 2,600 gas vehicles and developed a metric to score employees' driving behaviors. The technology alerts drivers when they accelerate too fast or brake too hard. These are both leading indicators for incidents that have the potential to cause extensive damage or a SPMVI. PG&E tracks a Safe Driving Rate by calculating the number of Hard Breaking events and Hard Accelerating events per 1,000 miles driven. A lower Safe Driving Rate ratio is preferred. In 2022, Gas finished with a Safe Driving Rate of 3.4, a 22.7 percent reduction from the previous year rate of 4.4. The company continues to improve

its motor vehicle safety program, conduct more driver observations, evaluate backing sensor technology, enhance driver safety training, and promote awareness campaigns. PG&E will strive to continue to reduce OSHA recordable injuries, DART rate, and motor vehicle incidents.

To improve coworker safety in the field, Gas:

- Initiated a pilot to evaluate the use of the Blackline Safety Worker monitor devices from December 2022 through May of 2023;
- The device provides the ability for vulnerable coworkers to initiate a distress signal that immediately notifies monitoring personnel and emergency response resources;
- The evaluation consists of volunteer coworkers piloting 146 devices in high-risk service areas in Oakland, San Francisco, Richmond, Stockton, Fresno, and Sacramento;
- Initial training for volunteered coworkers in Locate & Mark, Field Services, GC and Measurement and Control (M&C) is being provided by Blackline Safety;
- Feedback from coworkers during the pilot will be evaluated to determine the effectiveness of the device to improve field safety and to identify opportunities moving forward; and
- The Blackline Safety Worker monitoring device pilot is a continuation of our efforts to ensure everyone and everything is always safe.

Figure 5 – Example of Blackline Safety Worker Monitoring Device

6. REWARDING SAFETY EXCELLENCE

PG&E's performance goals reinforce expectations regarding management decisions and allocation of resources. PG&E awards employees and contractors for their safety excellence by encouraging safe behavior and practices. These awards include:

- **Eagle Eye Award** – Recipients of this award are those who submit Corrective Action Program (CAP) items identifying and addressing issues that result in significant improvements to safety, reliability, compliance, cost reduction, or process. Any employee can submit an Eagle Eye nomination.
- **Caught Being Safe** – Under this program, rewards and recognition are provided for employees who demonstrate safe behavior, speak up and take action to promote a positive safety culture, and/or support the 2025 Workforce Safety Strategy. As a token of appreciation, the employees who nominate them are also eligible to receive rewards and recognition. In 2022, most employees continued to find ways to recognize each other through the program even with the change for some employees performing remote work. The program continues to mature, and in 2022, employees submitted 71 Caught Being Safe nominations recognizing office and field-based employees.
- **Process Safety Champion** – This champion recognition distinguishes teams and individuals who have gone above and beyond in applying the keys to Process Safety to their work. Examples of going above and beyond include having a questioning attitude, taking time to evaluate hazards prior to starting tasks, and reporting into Corrective Action Program (CAP). Four (4) Process Safety champions were introduced in 2022 in the Process Safety Newsletters.

II. SAFETY CULTURE

PG&E's commitment to strengthen our safety culture and performance is reinforced by our stand that "Everyone and Everything is Always Safe"(see Figure 6). Gas Safety and Leadership worked to improve workforce safety through building a culture focused on the hearts and minds of our employees and cultivating a deeper partnership between Gas leadership, Grassroots Safety Teams, and the Labor Unions. The goals of the partnership were to prevent and reduce employee injuries, promote healing and return to work, and ensure quality and appropriate medical care for our employees. In 2022, with leadership support, Gas continued its focus on these goals.

In late 2021, a consultant was engaged to develop and implement a new element to Gas' safety approach through the creation of Safety Culture Guidance Teams (also referred as Village Safety Culture Teams). These five teams are composed of bargaining unit/management coworkers carefully selected for being safety leaders who can positively influence their teams locally. Each Safety Culture Guidance team have their own mission statement and culture actions to improve the safety culture of its village. To sustain the safety culture journey, the consultant has continued to provide virtual consultation to each village to ensure focus on culture work and culture-based project development. An effectiveness review video was created in support of the 1-year pilot results.

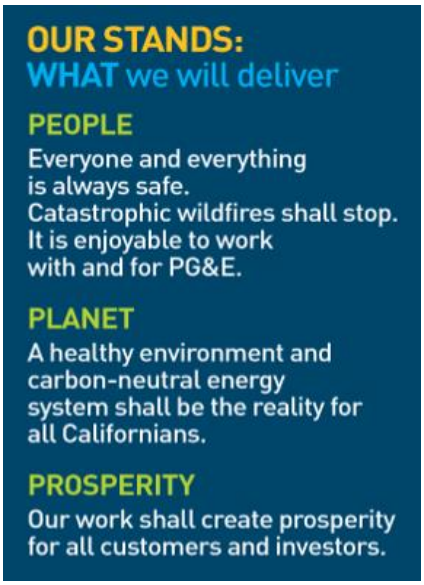


Figure 6 – PG&E Stands

In addition, a group of Gas coworkers received training to become Safety Culture Tools Facilitators to deliver key tools to employees to support Gas-wide culture topics. The full training process included skill acquisition, role-playing and critique, and it qualified candidates to facilitate four specific Culture-Based Tools: Culture Iceberg, Cycle of Mistrust, Changing Norms, and Safety Imaging.

In parallel, Gas Grassroots teams have continued to work on safety programs (such as training, PPE, policies and procedures, etc.). A review of the different Gas Grassroots Charters resulted in an opportunity for the teams to align under a single management sponsor so there is more clarity and consistency around Grassroots teams' roles and responsibilities.

The organization continued to build upon the prior years' benchmark learnings and improved upon the Gas Safety Council charter to include active participation and updates from Grassroots members and IBEW partners, including the Control the Pressure Team. The Gas Safety Council identified action items and facilitated closure through the charter guidelines. We also continued to expand the Grassroots Rally room to a broader group of key participants to improve collaboration and the resolution of identified safety concerns. There was also an increase in the number of problem solving sessions to identify improvements

in communications and leader engagement. Gas continues to deploy the existing (2017) safety leadership training program for all new role supervisors and crew leads.

Gas continued to champion the Industrial Athlete Specialist Team (IAS) for frontline employees and provide leaders with the necessary injury data to aid in implementation of injury prevention measures. Regional support consists of three to six Industrial Athlete Specialist to support the program. The IA program provides education and early symptom intervention to help our field coworkers avoid injuries and stay safe, healthy, and well at work. IASs are professionals trained in sports medicine. They are assigned to regions throughout the enterprise and visit sites within their region regularly. They are also available for "on call" services.

IAS Services include:

- Body mechanics coaching to prevent injuries on the job;
- Individual and group education on topics such as performing task-specific stretches and preventing sprains and strains; and
- Support for discomfort, both work-related and non-work related.

In 2022, 28 percent of the Gas eligible physical workforce participated in 1-1 services with an IAS. 97.3 percent of coworkers with a resolved IAS discomfort case did not have a new MSD-related worker's compensation claim within six months after case closure.

Virtual Ergonomic Assessments for Remote Workstations. In alignment with the enterprise requirement for office-based employees to complete preventative virtual ergonomic evaluations, 822 ergonomic evaluations were requested in 2022. Of the 822 evaluations requested, 809 have been completed, reflecting a 98.4 percent completion rate. Gas Leadership, in partnership with Grassroots Safety Teams and Labor Unions, will continue to reinforce PG&E's commitment to safety and encourage its employees to work safely. Gas will continue to use Industrial Ergonomics to minimize hazards related to work equipment, environment, tools, and processes through prioritization of frequency of activity by work type, looking for quick wins by changing out tools, and sharing immediate lessons learned with others to reduce hazards.

As an organization, PG&E's ongoing focus is to reduce unsafe behaviors by connecting with those that do the work, to build/improve our Safety Culture by focusing on the hearts and minds of our employees and to continue to build a deeper partnership between Gas and Labor Unions to drive safety.

1. Coworker Engagement

PG&E continues to support various coworker engagement activities and initiatives, some that have been in place in Gas for a while and some that are new. For example, in 2021 and 2022, the Executive Officer Team introduced the Lean Operating System (formerly Lean Management in Gas), the Joy at Work

survey (a way to measure coworker morale), and Breakthrough Thinking (process to foster extraordinary outcomes) as company-wide activities. These activities are in addition to Gas-specific initiatives in flight such as the Safety Leadership Development, Leader in the Field and the new Role of the Supervisor.

Lean Operating System. Gas deployed Lean Management in 2017 and continues to support and reinforce the importance of Lean thinking throughout the organization. The Executive Officer Team expanded Lean implementation to all PG&E organizations starting in 2021 by introducing the Lean Operating System as PG&E's way of working as we build a better, safer PG&E for our customers, coworkers, and our hometowns. The Lean Operating system is designed to drive more effective decision-making and reduce the human struggle that can be in the day-to-day work and that our customers sometimes face in working with us. The Company's Clear Sky Playbook is the standard for implementing the Lean Operating System, which lays out the four basic plays: visual management, operating reviews, problem solving, and standard work.

Lean implementation also encourages leaders to spend more time directly engaging with their team members. Leaders regularly visit locations where the work is occurring to meet coworkers, hear their thoughts on what is working well and where improvements are needed, and to observe the work being performed to identify opportunities for continuous improvement.

Safety Leadership Development. Beginning in 2017, the *Leading Forward: Safety Leadership* program was delivered to all operational leaders. The program originally included three workshops over three days: Shaping a Safety Culture; Identifying and Controlling Exposure; and You Are Not Alone. The program has been condensed into two days, but covers the same topics. In 2022, the training was delivered to all 'new to the role' gas supervisors and crew leads. A total of 76 Gas leaders (44 Crew Leads, 32 Supervisors and Superintendents) completed the program in 2022.

Leader in the Field. Leader in the Field was deployed in March 2020, which focused on the supervisors and managers being in the field with their coworkers to assist in removing barriers and resolving safety concerns. Across Gas, supervisors' time in the field averaged approximately 50 percent throughout the year in 2022; this means nearly half of their working hours were spent in the field with frontline workers. For PG&E Gas Operation Managers, time in the field averaged approximately 23 percent throughout the year in 2022.

Role of the Supervisor. This initiative aims to elevate and redesign the role of the supervisor, encompassing brand reputation and meaningful experiences where supervision is an attractive, important, and supported position throughout the company, and coworkers aspire towards the role. In 2022, PG&E hosted supervisor engagement and listening sessions in multiple coworker town halls; grew participation in the Supervisor Advisory Council beyond Gas and Electric Operations by onboarding Gas Engineering, Customer Operations, and other functional areas; expanded the Supervisor Central Program beyond Gas

by providing supervisors throughout the enterprise with a one stop shop for tools and resources and two quarterly community of practice calls; and established a hometown support team that provides support by functional area, region, and location.

Joy at Work. One of PG&E's stands is that it is enjoyable to work with and for PG&E. At the heart of making this stand a reality is creating an environment where all of our coworkers know Joy at Work. We believe our entire PG&E family has and should know Joy at Work in how we live and accomplish our Purpose—delivering for our hometowns, serving our planet and leading with love. We believe the key to our coworkers knowing Joy at Work is to be known, loved and proud to work at PG&E.

To develop a deeper understanding of our coworkers' experience as it relates to knowing Joy at Work, PG&E introduced a new survey to measure Joy at Work in 2022. The survey measured whether coworkers enjoy working for PG&E and whether coworkers feel known, loved and proud to work for PG&E.

We captured feedback from 14,478 coworkers and achieved an overall Joy score of 60 percent company-wide with similar results for Gas. We analyzed almost 15,000 coworker comments and identified 20 drivers of joy at PG&E. The results of the survey provide insights to leaders and their teams on actions to take to improve Joy at Work. The Joy questions will be asked again 2023 so that we may check in on progress and have additional insights on improving Joy at Work at PG&E.

Breakthrough Thinking. PG&E aims to become a "breakthrough organization" that delivers for hometowns, serves the planet, and leads with love. A breakthrough organization occurs when leaders and teams shift their mindset to achieve extraordinary outcomes. The company's Breakthrough Program has four key building blocks to help leaders and teams learn how to utilize breakthrough thinking to achieve breakthrough outcomes.

The first building block is the Breakthrough Intensive, an immersive leadership team experience that enables leaders to think and act in new ways by gaining fundamental tools to uncover and change mindsets. This program helps teams to emerge grounded in their ability to produce results that previously seemed impossible.

The second building block is the Performance Diagnostic, which provides leaders with a data-driven approach to measure and change a company's current environment. The Performance Diagnostic is a simple and scalable survey that uncovers intangible team dynamics that impact business performance. When used together with the Breakthrough Intensive, the Performance Diagnostic provides a powerful platform for essential performance conversations during times of crisis.

The third building block is Breakthrough Specialists, who play a critical role in cultivating the Breakthrough Performance Environment by delivering Performance Diagnostic debriefs in partnership with leaders and their teams. They are also equipped to lead the Breakthrough Performance Environment day-to-day, in service of impacting breakthrough performance across the business.

The final building block is Breakthrough Debriefs, which are a key tool for helping leaders and teams transform themselves by transforming data from the Performance Diagnostics into valuable information. Breakthrough Debriefs help leaders, teams, and specialists to review the results and connect the Five Factors and their business impacts to the teams' current performance. Specialists lead fluid conversations and explain the connections between the factors, helping team members understand how the factors and how changes in scores and distribution will impact their future performance.

PG&E will host 12 Breakthrough Workshops in 2023 to ensure that all leaders are empowered to create a breakthrough performance environment where breakthrough is the norm. The program's ultimate goal is to transform PG&E into a breakthrough organization that achieves breakthrough outcomes by shifting mindsets and embracing breakthrough thinking.

a) Corrective Action Program

The CAP is an integral part of our safety culture in Gas. PG&E's continued use and support of the CAP demonstrates to coworkers, contractors, regulators, and customers that we have an unwavering commitment to delivering safe, reliable, affordable, and clean energy. The CAP process ensures that notifications are categorized, assessed for risk, and assigned to the appropriate owner to resolve issues and implement effective corrective actions to help prevent recurrence. Our goal is to move Gas from a reactive approach of solving issues, to a proactive analysis that helps prevent issues before they result in an incident. CAP provides real-time data and ensures transparency and accountability. The system is designed to provide trending capabilities and a continuous improvement loop to capture lessons learned and to improve the safety and reliability of PG&E's operations.

The Gas CAP team is composed of CAP operation specialists and cause evaluators. The operation specialists handle the day-to-day management of CAP submissions, including assignments, coaching and training, reviewing closed CAP issues, trending analysis, data requests, and metrics. The cause evaluators facilitate the end-to-end process of an investigation or cause evaluation (root, apparent or common cause), including team training, interviews, analysis, report writing and working with the functional leader for approvals. The cause evaluation team is also responsible for all SIF coworker and contractor Serious injury or fatality (SIF) investigations and works in conjunction with Enterprise Safety to ensure effective implementation of the process.

What Gets Reported into CAP

PG&E encourages employees to identify issues related to gas assets, processes, and overall safety of our employees, contractors and the public to be entered into CAP for resolution and tracking. There are a few issues that may fall outside the scope of CAP (e.g., Ethics and Compliance issues, facility requests); however, we do not discourage their entry, but will transfer the CAP notification to the most appropriate tool/program for follow up.

How the Gas CAP Process Works

Initiation: The initiator, who can be any PG&E employee or contractor can submit any issue or process improvement idea into the CAP. Coworkers have several ways to submit an issue, such as through the CAP website, the mobile CAP App, the CAP helpline, paper form, SAP, or email to the CAP help desk. Once the CAP is in submitted status in Gas, the Gas CAP team will process it for assignment. On average, Gas employees submit roughly 750 CAP Issues each month.

Assignment and Resolution: The CAP process employs a standardized approach (Figure 7) to reviewing and assigning CAP Issues and Actions. This process is facilitated by the Gas CAP Review Team (CRT). The Gas CRT is composed of Subject Matter Experts (SME) from various Gas departments that meet regularly to review newly submitted CAP notifications. The CRT's function is to categorize each notification, assess it for risk (using the enterprise CAP risk matrix), and assign it to an issue owner. After the CRT meeting the CAP team finalizes each issue and prepares them for release to the agreed upon issue owners.

Once the CAP is assigned to an issue owner, it is the issue owner's responsibility to review the notification, identify the causes underlying the issue, and address them appropriately by implementing any necessary corrective actions to mitigate risks and/or prevent recurrence (based on risk and evaluation level).

After a CAP notification has been submitted and released to an issue owner, initiators receive an e-mail detailing to whom their notification was assigned. They also receive an e-mail again when their notification is closed. This gives the initiator the opportunity to learn how the issue was resolved, and to provide feedback on their satisfaction with the results.

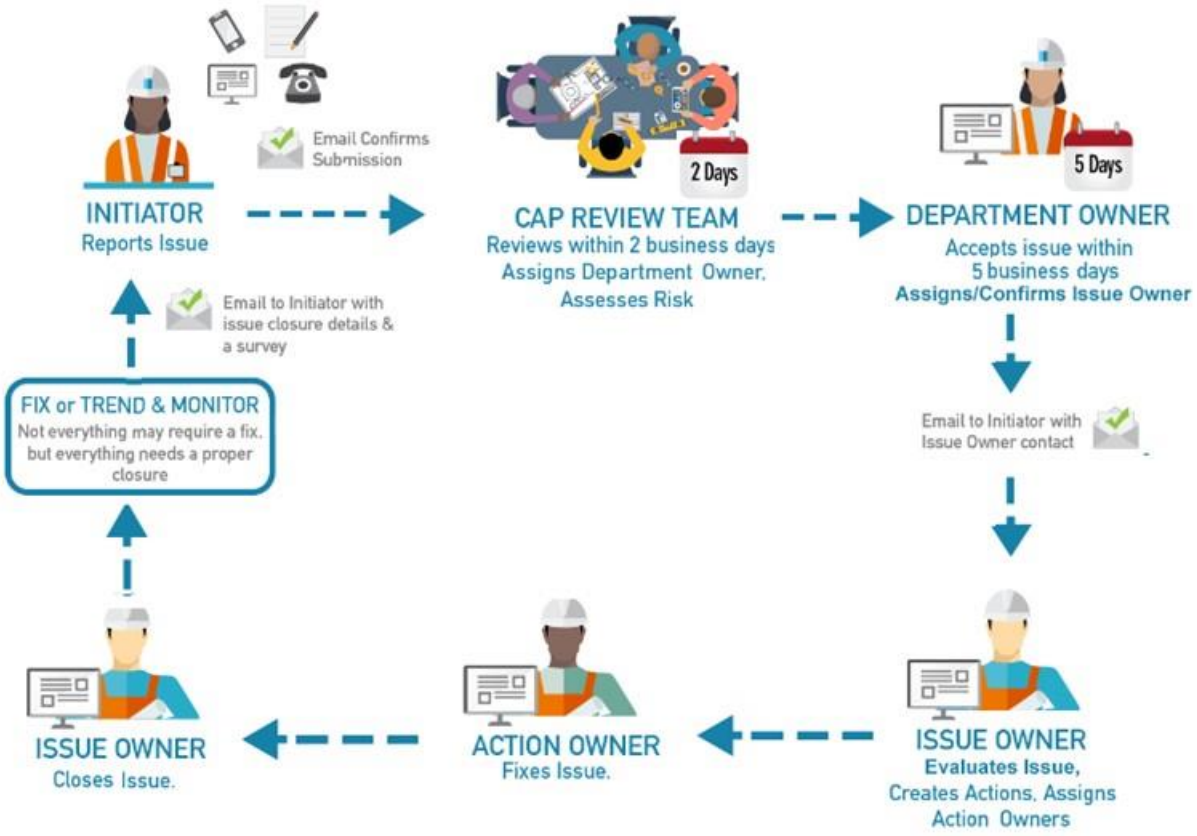


Figure 7 – CAP Process

How Notifications are Risk Ranked

Risk matrices are used to rate and compare risk of hazardous events by considering the likelihood and consequence of an event happening to increase visibility and to help with decision making on risk reduction processes. Risk and safety are highly dependent on an individual's perception, meaning risk and safety mean different things to different people. Risk matrices are designed to minimize individual influence and normalize risks to be uniform regardless of who is risk ranking hazards. Risk matrices, especially when assessed qualitatively, provide only an estimated assessment of risk and are used to provide initial decision guidance and do not produce definitive risk assessments. Quantitative risk assessment methods are available when a better estimate of risk is required to better allocate resources. The CAP risk matrix is a qualitative risk assessment.

The initial risk ranking of a CAP notification is based on the information available and application of the following calculation to assist reviewers with combining known facts to identify the risk of the CAP notification:

Probability of Event Occurrence x Severity of Consequence = CAP Notification Risk

- **Probability of Event Occurrence**: The extent to which an incident, event, or condition has occurred or recurred (frequency).
- **Severity of Consequence**: The result of an incident, event, or condition by considering the degree[3] the public, employee(s), or property was in jeopardy of harm or loss (severity). This includes an assessment of the risk associated with safety, asset damage, reliability, financial impact, compliance, environment, and reputation.

The CAP notification risk level is used to determine the appropriate evaluation type that will be assigned and provides Gas with the ability to prioritize CAP notifications. Cause evaluations are necessary to identify the cause of an incident, issue, or error, to prevent or minimize the probability of reoccurrence, and to apply continuous improvement processes. There are four types of cause evaluations:

- **Root Cause Evaluation (RCE):** An RCE is a formal and rigorous investigation that uses industry-accepted analysis methods to determine the root cause(s) of a problem. The RCE identifies required corrective actions that prevent or reduce the likelihood of a recurrence of the problem for the same or similar root cause(s).
- **Apparent Cause Evaluation (ACE):** An ACE is an evaluation based on readily available information that provides reasonable assurance that the cause of a problem is determined and will be corrected. An ACE is conducted when management determines a formal but less rigorous cause evaluation is necessary.
- **Work Group Evaluation (WGE):** A WGE is a logical evaluation of an issue to identify reasonable corrective or preventive actions needed to resolve an issue. Resolution of the issue may be addressed by another process, or a simple explanation of why something does or does not happen.
- **Common Cause Evaluation (CCE):** A CCE is an analysis method that can be used to identify common underlying elements among different, unique, but similar events or issues. The underlying elements may be anything from a common failure mechanism to a common cause that may or may not require further investigations. A CCE can be conducted only when the individual issues have been evaluated on their own merits (i.e., ACE or WGE report completed) and causes and corrective actions have been identified.

Figure 8 provides the Gas Event Classification Matrix (ECM), which was developed to provide formal guidance and consistency to determine the appropriate level of cause evaluation.

Gas Event Classification Matrix						
UNITENDED OPERATIONAL EVENTS[1]						
Investigation Level *May be escalated or deescalated by Leadership as necessary*	**PIPELINE HIT, RUPTURE, or EXPLOSION**	**PRESSURE EVENTS (Over and Under Pressure)**	**OTHER LOSS OF CONTAINMENT EVENTS**	**OTHER OPERATIONAL EVENTS**	**SAFETY**	**OTHER QUALITY/COMPLIANCE EVENTS**
Significant Operational Events *Root Cause Evaluation (RCE)*	• Transmission pipeline damage with loss of containment	• Overpressure event with loss of containment or overpressure event that impacts over 200 customers • Loss of service to over 2000 customers	• Explosion or fire due to loss of containment that impacts PG&E's or customer's property (i.e. house explosion)	• Loss of odorant (outside of regulatory limits) at customer lines • Loss of system wide visibility (SCADA) • Other events that significantly impact the safety, reliability, or integrity of the pipeline system	• SIF-Actual Events[3] • Serious injury or fatality to the public due to gas asset failure or operational change	• No new event types defined
Moderate Operational Events *Apparent Cause Evaluation (ACE)*	• Transmission pipeline damage with no loss of containment • Distribution asset loss of containment resulting in fire	• Large overpressure event with NO loss of containment[2] • Unintentional loss of service to 200-2000 customers (excludes non-at-fault dig-ins) • Reasonable potential loss of service to over 2000 customers (i.e. unintended closure of valves, blockage in pipeline)	• Significant gas accumulation within explosive limit due to loss of containment without appropriate safeguards • Other loss of containment events (i.e. lube oil, pipeline liquids) with moderate impact	• Loss of odorant (outside of internal limits) at customer lines • Potential loss of system wide visibility (SCADA) • Over-odorization of gas resulting in an increase in customer odor calls • Loss of visibility to multiple mountain tops (SCADA) for 4 hrs or more • Other events that had the reasonable potential to significantly impact the safety, reliability, or integrity of the pipeline system	• SIF-Potential Events[3] • Potential for serious injury or fatality to the public due to gas asset failure or operational change	• Mandated self-reports • NOV and NOPV findings requiring ACE as determined by regulatory compliance
Minor Operational Events *Work Group Evaluation (WGE)*	• At-fault dig-in on a distribution asset without fire or explosion	• Small overpressure event or near-hit overpressure event[2] • Loss of service to less than 200 customers (excludes non-at-fault dig-in)	• Loss of containment with low likelihood of fire or explosion	• Crossbore created during construction or maintenance activities	• Non-SIF injuries	• High Quality Assurance Findings • Self-reported non-conformances • NOV findings

1= An **unintended operational event** is defined as an event resulting from work at/for PG&E involving gas assets that impacted or had the potential to impact the following: the safety of the public or our workforce (employees and contractors); the integrity of gas assets; the reliability of gas delivery; normal operations of the gas system; compliance with standards and regulations. *Does not include 3rd party at-fault events or natural disasters.

2 = Small and large overpressure events are defined by FIMP.

3 = All workforce serious injuries or fatalities actual and potentials are determined using process and definitions in SAFE-1100S. Serious injuries are life-threatening or life-altering injuries.

Figure 8 – Gas Event Classification Matrix

A cause evaluation can be related to a wide range of topics in Gas, such as asset failures, reliability (e.g., dig-ins, overpressure (OP) events), and workforce safety incidents (i.e., SIF incidents). A cause evaluation can be requested by an employee on any CAP notification; however, an RCE is generally assigned to incidents where the consequence severely impacts public or employee safety, or reliability, and warrants rigorous analysis. All CAPs require a WGE, and formal (documented) WGEs are required for non-conformances and high-risk quality findings. Figure 9 shows the total number of evaluations completed in 2022. Gas completed 111 WGEs in 2022 related to Quality High Findings and Compliance issues.

RCE	ACE	WGE	CCE
3	33	9,026	3

Figure 9 – Gas Cause Evaluations Completed in 2022

How CAP Success is Measured

In 2022, Gas' goal was to engage at least 33 percent of its workforce to use CAP, and at year-end it had engaged approximately 24 percent. On average, Gas generates 9,000 – 10,000 CAPs per year, one of the highest rates within PG&E.

To ensure accountability and transparency, leaders receive an Executive CAP Dashboard Report (Figure 10) each week that details how their organization is performing on their CAP items. Key performance indicators reported in 2022 include:

- Percent of Unique Initiators – This is the number of employee submissions divided by the total count of employees. The 2022 goal was greater than or equal to 33 percent of unique initiators.
- CAP Throughput – This number measures the volume of work being completed by the organization. The 2022 goal was 1.0, meaning that the volume of closed notifications equals the volume of submitted notifications.
- Average closure satisfaction (1-5 scale) is the sum of survey scores divided by the number of survey submissions. The 2022 goal was an average closure satisfaction greater than or equal to 3.5, where 5 is "very satisfied" and 1 is "did not meet expectations."
- Quality closure (percent) is the number of CAP notifications passing quality review divided by the number of CAP notifications reviewed. The 2022 goal for quality closure was greater than or equal to 92 percent.
- Average Age of Open High-Risk Notifications (days) – This is the number of days high-risk notifications are open divided by the number of open high-risk notifications. The 2022 goal for average age of open high-risk notifications was 180 days.
- Average Age of Open Medium-Risk Notifications (days) – This is the number of days medium-risk notifications are open divided by the number of open medium-risk notifications. The 2022 goal for average age of open medium-risk notifications was less than or equal to 180 days.

Figure 10 shows how Gas performed against the above-mentioned key performance indicators in 2022.

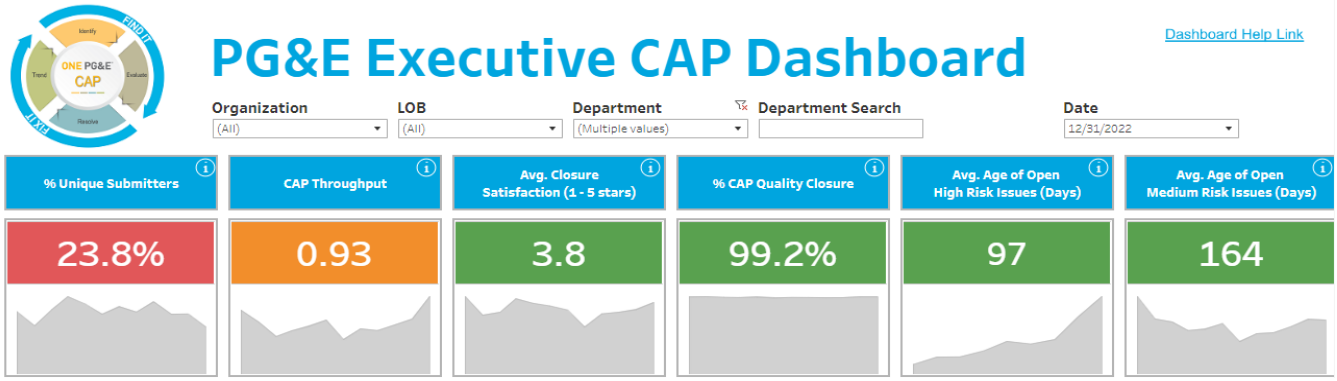


Figure 10 – CAP Metrics

Continuous Improvement and Speak Up Culture

The Gas CAP process continues to mature and serves an important role in Gas to identify and mitigate operational and safety issues and implement process improvements. The Gas CAP department also looks for ways to improve how it supports the business and continues to bring added value to operations.

Eagle Eye Program: The Eagle Eye Program was created to recognize employees who use the CAP to identify and address issues that result in significant improvements to safety, reliability, compliance, cost reduction, or process. The program was so successful in Gas that all of PG&E's functional areas adopted the Gas model when CAP was deployed company-wide. In 2022, the CAP Department logged 27 Eagle Eye nominations, which included nominations for identifying and submitting "good catch" issues and for efforts in resolving those issues. In 2022, one Eagle Eye winner was awarded (individual contributor) for bringing light to an issue in Gas involving gas riser protection in a community.

Trending: The CAP team improved its methodologies and capabilities within the trending program to track and analyze similar or repeat issues. As part of our efforts, the process evolved from capturing cognitive trends during CRT meetings by standing up a new structured potential trend process. The potential trend process complements the cognitive trend process by creating a formalized systematic statistical approach. The CAP team performs monthly Potential Trend (PT) analysis at Director/Manager level using SAP exported data to "bucket" data into categories utilizing issue type, subtype, department, and risk level. The data is then analyzed based on issue count within each bucket. If a PT is identified, then a new CAP is created as a stand-alone CAP for further analysis to determine whether the trend is classified as adverse. Using these processes, the team is able to capture emerging trends that can be further analyzed and communicated to key stakeholders within Gas. These trends are categorized by issue type, subtype, functional team, and risk level to further identify common issues and trends.

Through this approach, the CAP team discovered 7 potential trends in 2022 and provided analysis and recommendations to the respective functional team in Gas.

Quality Closure Review (QCR): QCR is a process in which the CAP team reviews closed notifications to determine if the responses meet the minimum quality closure requirements. To meet QCR, the notification must meet the following: (1) Well defined issue; (2) Not closed to a promise; (3) Sufficient documentation; (4) Justification for no action taken; and (5) Extent of Condition performed (if required). Gas CAP reviews 100 percent of all closed notifications on a weekly basis. If the CAP team determines that a notification did not meet the minimum requirements of QCR, then a team member will reach out to the issue owner and coach them on what a quality closure should look like. This process adds value to the organization by creating an expectation on how a notification should be resolved and closed.

b) Ethics & Compliance Helpline

PG&E's Ethics and Compliance (E&C) Helpline is a toll-free telephone number and website available to employees, contractors, consultants, suppliers, and customers 24 hours a day, 7 days a week. The E&C Helpline, managed for PG&E by NAVEX Global, enables reporting parties to request guidance about our Code of Conduct (Code) or make a good-faith report of violations such as fraud, accounting issues, or illegal activity. Callers may remain anonymous.

Concerns raised with E&C through its Helpline or any other method are documented and tracked to closure. PG&E has a strict policy against retaliation against anyone who speaks up or is involved in an investigation. The E&C Helpline is part of PG&E's commitment to foster a workplace where everyone feels safe to ask for guidance, share ideas or raise concerns—and one where everyone is confident that those concerns will be heard and taken seriously.

c) Material Problem Reporting

PG&E also encourages employees to report and act on problems with any materials, tools, gas, electric, and other equipment or infrastructure through the Material Problem Reporting (MPR) system. PG&E leverages the CAP reporting process to route material related problems to the MPR system. The MPR process is cross-functional and relies on employees at all levels of the business to identify potential safety issues stemming from material problems.

MPRs can be identified from two different sources:

1) As material arrives at PG&E's facilities, the PG&E team may identify "Incoming MPRs."
2) As work is performed with materials, personnel may identify "Field MPRs."

Incoming MPRs that are quality tested and found to fail at receipt prompt the creation of a Supplier Corrective Action Request (SCAR), requiring the supplier to resolve the issue. The SCAR process and system is managed by Supplier Quality Assurance (SQA) to ensure proper corrective actions are implemented. In 2022, the average of gas incoming MPR's had an average cycle time of 16 days, with a target of 20 days.

Field MPRs are submitted by field personnel from various job sites and PG&E locations who either received a problematic new material or identified a failed part on an asset as applicable. These Field MPRs are evaluated by Gas Engineering. PG&E uses trending from combined MPR data lists to review with subject matter experts (SMEs). This is in line with the Wildfire Order Instituting Investigation (OII) requirements to trend MPRs generated in the field and allows insight into recurring material issues. In 2023, PG&E will further develop the process for reviewing trends. In 2022, the field MPR program resulted in Supplier Quality issuing 82 SCARs and two (2) Purges (a Purge is a PG&E system wide material recall).

2. PG&E Corporate and Gas Safety Committees

PG&E's safety governance structure drives a consistent safety culture and aligns to PG&E's safety strategy and results. Table 1 describes PG&E's Corporate and Gas safety committees and meetings. Gas utilizes the forums described in Table 1 to ensure alignment with the Chief Risk Officer/Chief Safety Officer (CRSO) across the enterprise.

Table 1 – Safety Committees and Meetings	
Board of Directors Safety and Nuclear Oversight (SNO) Committees	Provides oversight and review of (i) policies, practices, goals, issues, risks, and compliance relating to safety (including public and employee safety), and compliance issues related to PG&E's nuclear, generation, gas and electric transmission, and gas and electric distribution operations and facilities ("Operations and Facilities"), (ii) significant operational performance and other compliance issues related to such Operations and Facilities, and (iii) risk management policies and practices related to such Operations and Facilities.
Safety Weekly Operating Review (WOR)	Provides a forum to focus discussion on Safety related metrics and topics including Serious Injury and Fatality events, learnings, and mitigations and Safety Strategy execution. Participants include the Senior Leadership Team (SLT) and functional area leaders.
PMVI Daily Operating Review (DOR)	Provides a forum to focus discussion on Preventable Motor Vehicle Incidents, learnings, and mitigations. Participants include functional area leaders who have experienced a PMVI the prior day.
DART DOR	Provides a forum to focus discussion on DART cases, learnings, and mitigations. Participants include functional area leaders who have experienced a DART the prior day.
Gas Safety Council	Sponsors initiatives to improve safety across the Gas Functional Area. Monitors Gas safety performance and initiatives to ensure risks are adequately addressed.
Gas Grassroots Safety Teams	Employee-led, leadership supported efforts to identify opportunities to improve safety, define and validate possible solutions, and implement and promote safety initiatives.

a) Gas Safety Council

In 2022, the Gas Safety Council continued to meet monthly. This meeting is facilitated by the Senior Director of Gas Safety, Quality and Qualifications. The Council is composed of Senior Leadership including the Senior Vice President (SVP) of Gas Operations, SVP of Gas Engineering, Vice President of Gas T&D, and the Senior Director of Safety, Quality and Qualifications and Labor Union Leaders from the IBEW Local 1245 and ESC. Invited attendees include the Grassroots Safety Teams,[4] Gas Safety, Corporate Safety and other key stakeholders as needed. The primary objective is to provide overall governance of safety, to guide department safety strategy, to ensure compliance with Company safety standards, to execute Chairman's Risk and Safety Committee directives, to provide another channel to raise safety concerns, and to promote positive safety culture change.

Last year, the Gas Safety Council facilitated the productive discussion and effective closure of 44 safety concerns, including the Oakland police pilot, rubber glove trainings, active shooter awareness, and trainings for employees working in hazardous environments.

b) Gas Grassroots Safety Teams

Gas Grassroots Safety Teams are composed of Chairs, Co-Chairs, and members primarily from Gas field positions. The Chairs meet on a regular cadence to discuss issues, strategy, concerns, successes, roadblocks, and any barriers that may exist. As of December 2022, Grassroots had over 192 members. The

teams include Field Services, M&C, Locate and Mark, GC Gas, corrosion and leak survey and Gas Transmission.

Highlights from Gas Grassroots in 2022 include:

- More Internal SMITH System Instructors became qualified and have been working with leaders and CWs to complete Behind the Wheel Trainings;
- A 100-page "Working Safely from Home Handbook" was created by a cross-functional team of volunteers in Electric and Gas Ops, that includes safety topics on office ergonomics, mental health and emergency preparedness;
- Gas Field Services Safety Team received PG&E's Sibley Award for developing Leading with Safety program; and
- Hosted several engaging safety summits on substance abuse, mental health, Live Safe, IAS stretch and flex.

The Grassroots Video team published newsletters and 45 safety videos highlighting significant safety topics including SIF incidents, showcasing new tools, and promoting safety-related events such as Live Action Drills, Driving Rodeos, and Safety Summits.

Figure 11 – Grassroots TV Photos

III. Process Safety

Process Safety Management[5] focuses on preventing low frequency, high-consequence incidents and mitigating the consequences from these incidents. The Process Safety Management System is used for engineering new facilities, modifying existing facilities, maintaining equipment, and ensuring safe operation.

The Process Safety Management System consists of four foundational areas (Figure 12): Commit to Process Safety, Understand Hazards and Risk, Manage Risk, and Learn from Experience. PG&E is improving process safety performance by strengthening performance in each of these areas. Process Safety Management System is well integrated within the GSEMS, [see Section I.2 *Gas Safety Excellence Management System*] to safely manage the planning, construction, operation, decommissioning and maintenance of gas assets and associated activities and ensure the safe, reliable, affordable and clean delivery of natural gas.

Figure 12 – The PG&E Process Safety Management System

2022 Process Safety Highlights

Commit to Process Safety. Guided by the elements set by the Center for Chemical Process Safety, PG&E's continued commitment to implement process safety aligns with American Petroleum Institute (API) Recommended Practice (RP) 754 *Process Safety Performance Indicators for the Refining and Petrochemical Industries*.[6] To help Gas operate, maintain safe facilities and consistently implement process safety practices, the Gas Process Safety team continued to review new and updated procedures and standards. In addition, Gas Process Safety contributed to the development of the enterprise-wide PG&E Safety Excellence Management System (PSEMS). The PSEMS prevents injury and illness by systematically managing processes, assets, and occupational health. Process Safety is a key pillar to PSEMS, and the Gas Process Safety team contributed their Process Safety Management expertise and experiences during the development of the PSEMS framework, elements, and manual.

Understand Hazards and Risk. Process Safety Management is a key component in reducing PG&E's operational risk exposure. The team continued to focus on maturing design risk assessments, simplifying project design-phase Process Hazard Analysis (PHA) activities and checklists, and conducting complex

projects and facility PHAs. In 2022, Gas Engineering conducted PHAs for more than 99.9% of all applicable projects; 794 in gas distribution and 830 in gas transmission.

Manage Risk. In 2022, risk mitigation efforts included Management of Change (MOC) (Figure 13) process improvements, Pre-Startup Safety Reviews (PSSRs) and the identification of safety critical equipment (SCE). The MOC improvements focused on ensuring that changes are evaluated to identify hazards and that associated risks are effectively managed. Efforts included sharing and publicizing three MOC videos produced by Grassroots Safety and the publication of the quarterly MOC newsletter. PSSRs were completed for 177 gas transmission projects to ensure identification and mitigation of risk prior to tie-ins.

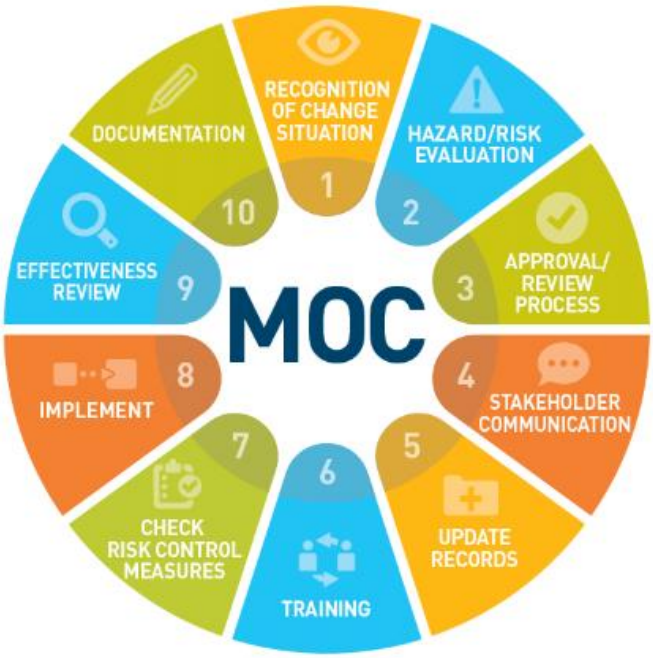


Figure 13 – Gas MOC Process

Finally, the Gas Process Safety team developed criteria for identifying safety critical equipment (SCE) and worked with the PHA teams to create SCE lists for gas processing and compressor facilities. These SCE lists are used to prompt additional assessments and management of risk prior to project execution.

Learn from Experience. As PG&E strives to continuously improve in process safety, Gas Process Safety engineers support incident investigations and cause evaluations on an as-needed basis. Lessons learned from these incidents are shared through Process Safety Moments that are shared regularly during the DORs, huddles, or other senior leadership platforms.

In 2022, Gas continued the journey of Process Safety Management maturity. Gas continued to be compliant, per a third-party assessment, with the intent of API RP 754 and Process Safety Performance Indicators, demonstrating a commitment to incident prevention. The Process Safety Indicator (PSI) Dashboard is based on a pyramid framework from the most serious incidents (Tier A) at the top to leading indicators such as issues indicating operating discipline or management system concerns (Tier D) at the bottom of the pyramid (Figure 14). The PSI Dashboard strives to drive ownership and accountability and to ensure leading indicators (Tier C and D) are acted upon to prevent a major gas incident (Tier A and B) that can lead to serious injuries, fatalities, or cause significant interruption to the gas business.

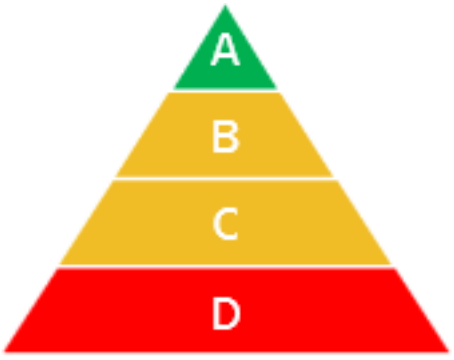


Figure 14 – Pyramid Framework for PSI Dashboard

In addition, the Gas Process Safety team improved the PSI Dashboard functionality, conducted trend analysis for the leading and lagging indicators, and conducted a gap analysis for the interconnectivity of the various leading and lagging indicators metrics among the individual PSI Dashboard Tier levels A through D (see Figure 14).

Finally, the Gas Process Safety team continued to identify Gas Incidents (GIs) and Process Safety Near Hits and supported further development of the Process Safety Near Hit Program to align with the Gas and enterprise-wide Near Hit Program. The Gas Process Safety Near Hit Program's mission, guided by the Safety Principles and Keys to Life, is to substantially advance the enterprise-wide engagement in the reporting, sharing, and dialogue of Near Hit and hazard events to prevent employee and public safety incidents.

IV. Asset Management

PG&E builds, operates, and maintains natural gas infrastructure to transport, store, and deliver gas to customers over Northern and Central California. There are risks inherent to operating any natural gas system; this is particularly true for PG&E's system that passes through populated areas and a wide variety of terrain. The top three operational risks confronting PG&E's natural gas system are the Loss of Containment on Gas Transmission Pipeline, Loss of Containment on Gas Distribution Main or Service, and Large Over-pressurization Event Downstream of Measurement & Control Facility.[7] PG&E's strategy to address these risks through asset management consists of knowing the assets and their condition, understanding the risks involving those assets, and developing and implementing risk reduction strategies with the intent to achieve risk reduction in balance with operational performance and cost. For this reason, Asset Management and Life Cycle Planning is the second element of PG&E's GSEMS. The following section describes PG&E's asset management system, the asset families, how PG&E's Gas manages risk, and the current risk portfolio.

1. Asset Management System

PG&E maintains an asset management system to help drive the business toward achieving its commitment to the safe, reliable, affordable management and operation of PG&E's gas assets. Using the PAS 55: 2008 and ISO 55001: 2014, PG&E's asset management system focuses on:

Knowing the condition of the assets,

- Understanding the risks to those assets;
- Implementing asset risk reduction strategies;
- Maintaining asset condition and performance; and
- Balancing asset cost, risk, and performance in pursuit of the asset management strategic objectives.

The Gas Safety Excellence Policy lays the foundation for PG&E's Gas Asset Management system while the vision and strategy for enhancing the system is documented in the Strategic Asset Management Plan. PG&E also maintains risk-informed Asset Management Plans for each of its nine gas asset families. Finally, PG&E reports regularly to the California Public Utilities Commission (CPUC or the Commission) on its safety and reliability investments.[8]

2. Asset Family Structure

PG&E continues to use the asset family structure to identify, manage, and mitigate risks faced by the gas assets. The asset family structure also provides a consistent approach for PG&E to address risks. PG&E identified nine asset families within Gas, which are illustrated in Figure 15.

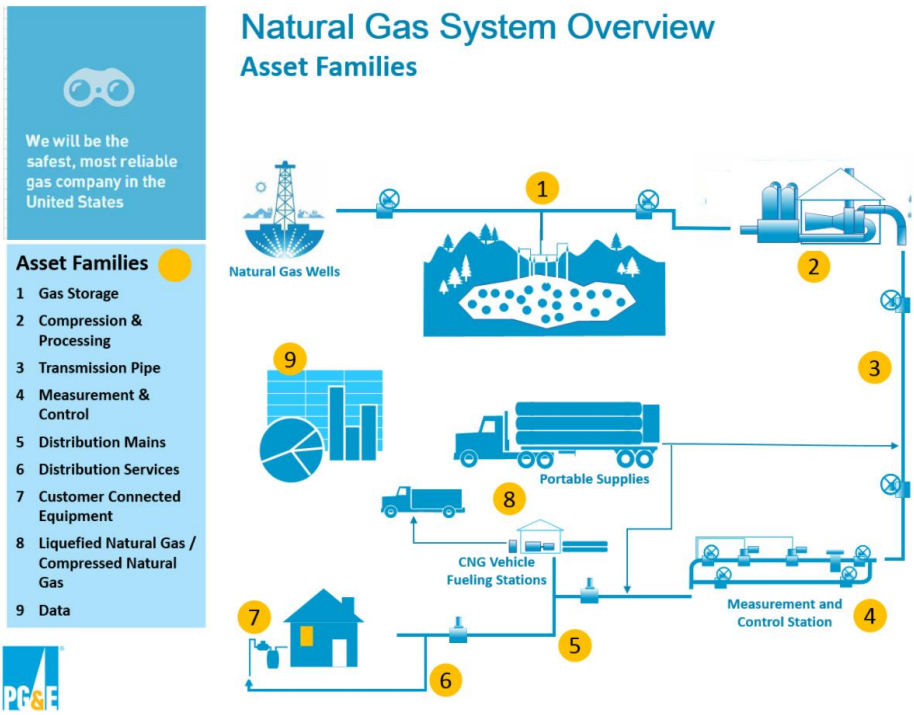


Figure 15 – Natural Gas System Overview – Asset Families

Each asset family has an Asset Family Owner (AFO) who is responsible to understand the asset condition, the risks to the assets, and to develop a risk-informed Asset Management Plan (AMP). An AMP is a five plus year plan for managing gas assets. For 2022 changes to PG&E's AMPs, please see Attachment 02.

The AFO leads the preparation of the AMP for each asset family that describes:

- Asset inventory and condition;
- Asset threats and risks;
- Desired state for the assets and strategic objectives for achieving desired state;

- Programs and risk mitigations; and,
- Areas for continual improvement.

These AMPs are living documents that evolve as new asset or risk management information becomes available. The following section summarizes the types of assets in each family, the function these assets serve in the gas system, and the progress towards achieving long-term goals.

a) Gas Storage

Presently, the Gas Storage Asset Family includes PG&E's owned and operated underground natural gas storage facilities at McDonald Island, Los Medanos, and Pleasant Creek. The primary assets within this family include 106 storage wells, 14 miles of transmission pipe, well controls for each injection and withdrawal wells, and 3,404 acres of storage reservoirs with over 51.1 billion cubic feet (Bcf) of working gas capacity.

Figure 16 – Rig and Well Platform

However, long term demand forecasts are expected to decline as California works to meet its Greenhouse Gas (GHG) emissions goals. Additionally, our current asset structure and reliability model continue to be impacted by new regulations that have initiated major changes to the requirements around design, risk and integrity management, and operations and maintenance for wells and reservoirs. Regulatory decisions related to gas storage continue to be promulgated and are expected to continue to increase and evolve in the coming years.

The U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration (PHMSA) issued its Final Rules in January 2020, adopting all of the API's RPS 1170[9] and 1171[10] outlining requirements around risk and integrity management, design standards, emergency response, and training. Likewise, the California Geologic Energy Management Division (CalGEM) introduced final regulations effective October 2018 requiring modifications to well design and construction to eliminate the single point of failure changing the configuration of the wells to tubing and packers resulting in an estimated reduction of the withdrawal capacity of about 40 percent. PG&E continues to implement the construction requirement for tubing and packer; this work is planned to be completed in 2024. PG&E has proposed a risk based reinspection cycle to CalGEM and is awaiting their approval.

Furthermore, CPUC decision D.19-09-025 in PG&E's 2019 Gas Transmission and Storage (GT&S) Rate Case adopted the Natural Gas Storage Strategy (NGSS) that proposed modified storage services with an effective date of April 1, 2020. The NGSS includes the selling or decommissioning of the Pleasant Creek (2 Bcf working gas) and Los Medanos (11 Bcf working gas) storage fields. On January 31, 2020, PG&E filed Advice Letter 4210-G with the CPUC, outlining the process for selling and/or decommissioning of the

Pleasant Creek storage field; PG&E is still engaged in the sale process with an interested party for the sale of the Pleasant Creek Facility. Further, PG&E is awaiting a decision in the 2023 General Rate Case (GRC) filed on June 30, 2021, in which PG&E communicated its intent to retain Los Medanos and continue to operate the facility as storage.

PG&E's Gas Storage Asset Family has a Well Risk and Integrity management program inclusive of PHMSA's and CalGEM's final regulations. As part of the program in March 2019, we filed a seven-year plan for review and approval by CalGEM to meet the deadlines established by the regulations to periodically inspect wells and retrofit all of our storage wells to tubing and packer by 2025. In December 2020, PG&E received correspondence from CalGEM indicating the proposed testing schedule coupled with conversion was not satisfactory and a revised testing schedule was required to be submitted to CalGEM in January 2021. On June 15, 2021, CalGEM accepted the modified plan conditionally to complete baseline inspections in accordance with CCR, title 14, Section 1726, provided additional measures be implemented including: (1) annual thru-tubing well inspections; (2) 24-month pressure testing following a well's conversion to dual barrier; and (3) monthly reporting of progress and schedule of well inspection activity. On January 20, 2023, PG&E submitted the applied view of the reinspection methodology to CalGEM and CalGEM currently reviewing PG&E's plan.

The Gas Storage Asset Management Plan describes the strategy for mitigating and managing risk for this asset family and achieving the established asset management objectives. Examples of key objectives included in the Asset Management Plan are shown in Table 2.

Table 2 – Gas Storage Asset Management Plan Strategic Objectives and Progress To-Date	
Overall Objective/Goal	**Progress Towards Goal**
Complete baseline well production casing assessments on 108* wells by 2025 *9 Wells Plugged & Abandoned from 2017-2022, for a net remaining wells of 106	Number of baseline assessments performed: 2013 – 2016: 27 wells 2017: 8 wells 2018: 13 wells 2019: 15 wells and additional 33 wells not previously assessed for casing integrity inspected using through tubing technology (new) 2020: 20 wells 2021: 17 wells 2022: 18 wells
Evaluate and incorporate Well Risk & Integrity Management Plan (WELL) enhancements	2016: Submitted final WELL documentation to CalGEM for approval and identified improvements to WELL to incorporate in scheduled revisions of the publication 2017: Published updates of WELL to include enhanced design 2018: Amended WELL and submitted to CalGEM in April 2018. Completed evaluation of final CalGEM regulations when issued 2019: Revised WELL and filed with CalGEM on 3/31/19 per final regulations for review and approval 2020: Reviewed and revised WELL with sections re-rewritten as either standards, procedures or guidance 2021: Published WELL Rev 6, TD-4870M 2022: Published necessary updates to TD-4870M
Assess work on transmission pipeline through Transmission Integrity Management Program (TIMP)	2016: Completed written monitoring and assessment plans; Began development of 10-Year Storage Pipe Plan to assess pipe integrity 2017: 2019 GT&S Rate Case submission included funding request for strength testing pipeline in the Storage Asset Family 2018: Replaced 1.65 miles of transmission pipe. (Whiskey Slough east) 2019: No replacement projects due to construction scheduling conflicts 2020: Installed single line 1.6 miles and removed 2.6 miles of dual lines transmission pipe on the west side of Whiskey Slough 2021: Installed single line 1.1 miles and removed 2.2 miles of dual lines transmission pipe on the north side of Turner Cut 2022: Completed Turner Cut South Pipe replacement project
Continue PHA and PSSR on all well, surface equipment, and pipeline in storage asset family	Number of PHAs and PSSRs complete: 2014: 2 PHAs and 0 PSSRs 2015: 3 PHAs and 7 PSSRs 2016: 4 PHAs and 11 PSSRs 2017: 2 PHAs and 10 PSSRs 2018: 15 PHAs and 5 PSSRs 2019: 24 PHAs and 12 PSSRs; incorporated API RP 754 classifying events according to their tier system 2020: 38 PHAs, 15 PSSRs 2021: 36 PHAs, 14 PSSRs 2022: 34 PHAs, 20 PSSRs

The Gas Storage Asset Management Plan describes these objectives in more detail.

b) Compression and Processing

PG&E's Compression and Processing (C&P) facilities move gas from receipt points to customer delivery locations and provide for injection and withdrawal of gas at PG&E's underground gas storage facilities. Gas processing equipment provides gas that is free from particulates and is sufficiently dehydrated and odorized so that it can be transported to the gas T&D systems meeting quality requirements. This asset

family includes nine transmission compressor stations. Storage compressors are also installed at PG&E's three underground storage facilities.[11] Major assets include 41 company-owned compressor units, as well as associated equipment such as filter-separators, odorizers, pumps, motor control centers, station piping, among others. These stations are critical in maintaining the reliability of the gas system.

Figure 17 – Delevan Compressor Station Turbine Exchange

The C&P Asset Management Plan describes PG&E's strategic objectives related to the C&P assets. Key strategic objectives for C&P assets include the following:

Table 3 – Compression and Processing Asset Management Plan Strategic Objectives and Progress To-Date	
Overall Objective/Goal	**Progress Towards Goal**
Maintain total number of compressor unscheduled outages at current target in 2022.	Total number of compressor unscheduled outages exceeded performance expectations in 2022. Target = 224; Actual = 136.
Complete ECA1 activities by the end of 2022.	Strategic objective completed. Generated asset knowledge data for over 700 gas transmission stations over the course of the program.
Complete MAOP reconfirmation (ECA2) and/or pressure (strength) testing activities on at least 50 percent of transmission station mileage by July 3, 2028 as required by CFR 192.624(b)(1).	Completed field inspections at 23 locations. Submitted multiple strength test project scopes to execution team.
Complete critical documents defined by TD-4551S for all facilities by end of 2022.	Strategic objective completed. Completed a total of over 400 facilities over the course of the program.

The C&P Asset Management Plan describes these objectives in more detail.

c) TRANSMISSION PIPE

The Transmission Pipe asset family consists of approximately 6,500 miles of line pipe and major components, such as valves and fittings, used in transporting natural gas.[12] PG&E's Transmission Integrity Management Program (TIMP) governs how PG&E identifies threats and evaluates risks, reduces risk through risk mitigation activities, and assesses integrity performance within the Transmission Pipe asset family. TIMP is a core foundation of PG&E's ongoing efforts to provide safe and reliable service, consistent with industry best practices and based on federal TIMP regulations.[13] The Transmission Pipe Asset Management Plan describes the roadmap for mitigating and managing risk for this asset family and achieving the established asset management objectives. The plan's objectives include the following:

Figure 18 – Line 300A span in Topock

Table 4 – Transmission Pipe Asset Management Plan Strategic Objectives and Progress To-Date	
Overall Objective/Goal	**Progress Towards Goal**
1. Expand the integrity management program to pipelines in HCAs, MCAs and non-HCA Class 3 & 4 by end of 2034.	• 81.4 percent miles of pipe where baseline assessments have been applied covering HCAs, MCAs and Class 3 and 4 • Identified and Integrated into TIMP 828 miles of MCA • Identified and Integrated into TIMP 72.5 miles non-HCA non-MCA, over 30 percent SMYS in Class 3 and 4
2. Execute TIMP to achieve program objectives of zero incidents and full compliance.	• 1 PHMSA reportable incident in 2022 attributable to Transmission Pipe assets (5 PHMSA reportable incidents total) • Completed 102.36 miles of 2022 HCA Assessment credit mileage • 2 missed assessments totaling 2.84 miles • Significant improvements to pipeline threats modeling resulted in releveling ~1,500 miles of threats
3. Upgrade 69 percent of the transmission system for in-line inspection devices by end of 2036.	• Completed all upgrades needed to make the backbone system (Redwood and Baja paths) capable of in-line inspection. • In Line Inspection - upgraded 242.9 miles and inspected 494.9 miles in 2022, the most mileage ever inspected in a year • 49.42 percent of the system is piggable (through EOY 2022) • See Section IV.5.g for additional information on in-line inspection
4. Manage the Corrosion Control system and practices to further reduce the time-dependent corrosion risks by end of 2029.	• Transitioned all GT monitoring points to new criterion (-850 off, 100mV, -950 off, modified On) reducing GT corrosion risk • Cathodic protection (CP) availability maintained at 91.9 percent in 2022 • Conducted Close Interval Surveys (CIS) on 304.9 miles, in 2022 for a total of 4,345 miles (67 percent) • All transmission meeting -850mV off criterion, in 2022
5. Meet 100 percent of system capacity obligations and minimize high risk manual operations in peak day conditions.	• High risk manual operations did not change (from 8 in the 21-22 winter to 8 for the 2022-23 winter) • 8 of 9 transmission regions meet all expected load conditions • See Section IV.6.a for more information on System Capacity Design Criteria
6. Update PG&E's gas transmission assets to improve incident mitigation management (IMM) by end of 2030.	• Installed 4 automated valves in 2022. 49.6 percent System meeting IMM gas evacuation time goal • See Section IV.7.d for additional information on automated valves
7. Achieve and maintain a first quartile Damage Prevention program to further reduce transmission dig-ins.	• See Section IV.5.a for more information on PG&E's Damage Prevention Program and progress

The Transmission Pipe Asset Management Plan describes these objectives in more detail.

d) Measurement and Control

PG&E's M&C assets monitor, measure, and control pressure and flow within the gas T&D systems. The assets in this family perform a critical role in system safety by protecting downstream assets from system pressure excursions and gas quality degradation. Additionally, in concert with the C&P Asset Family, these assets perform a key role in overall system reliability.

Figure 19 – M&C Complex Station-Above Ground

The physical assets within this family include three gas terminals, 346 gas transmission stations, 474 transmission large volume customer type assets, 95 automated valve sites, 2,388 distribution district regulator stations, 1,494 farm taps, as well as more than 125 odorizers and 75 assets that monitor gas quality. PG&E's M&C equipment is located above and below ground, as well as within vaults and buildings. Examples of M&C complex and large volume transmission stations are shown in Figure 19 and Figure 20.

Figure 20 – Large Volume Customer Transmission Station

The M&C Asset Management Plan describes PG&E's strategic objectives for the M&C assets. The strategic objectives for M&C assets are the following:

Table 5 – M&C Asset Management Plan Strategic Objectives and Progress To-Date

Overall Objective/Goal	Progress Towards Goal
Mitigate overpressure risk due to common failure mode at 50 percent of H-14 facilities by end of 2022.	• Large overpressure (OP) events per year: 2019 – 11; 2020 – 9; 2021 – 5; 2022 – 9. • Published third revision of OP Long-Term Plan. • Strategy for mitigation of facilities that are most susceptible to large OP events has been developed and is in execution. Continued installation of secondary overpressure protection devices. Approximately 44 percent of H-14 facilities currently have devices installed.
Complete all ECA1 activities by end of 2022.	Strategic objective completed. Generated asset knowledge data for over 700 gas transmission stations over the course of the program.
Complete MAOP reconfirmation (ECA2) and/or pressure (strength) testing activities on at least 50 percent of transmission station mileage by July 3, 2028 as required by CFR 192.624(b)(1).	Completed field inspections at 23 locations. Submitted multiple strength test project scopes to execution team.
Complete critical documents defined by TD-4551S for all facilities by 2022.	Strategic objective completed. Completed a total of over 400 facilities over the course of the program.

The M&C Asset Management Plan describes these objectives in more detail.

e) Distribution Mains and Services

Figure 21 – Employee Working on Distribution Main and Service

This asset family includes approximately 43,700 miles of pipeline that connects to the gas M&C asset family on the upstream side and transports natural gas to customers throughout the service area. It also includes over 3.6 million service lines that deliver gas from the distribution mains to the assets in the Customer Connected Equipment family on the downstream side. The Distribution Mains and Services asset family begins at the outlet of the Measurement and Control regulator station assets and ends at the inlet of the distribution service shutoff valve which is where the Customer-Connected Equipment asset family begins. The programs associated with the Distribution Mains and Services asset family are focused on the inspection, maintenance, and replacement of Distribution Mains and Services assets. PG&E continues to identify and assess threats to Distribution Mains and Services assets and works to mitigate those threats, including through its Distribution Integrity Management Program (DIMP). Some key strategic objectives include the following:

Table 6 – Key Distribution Mains and Services Metrics	
Overall Objective/Goal	**Progress Towards Goal**
Achieve and maintain 1st quartile for 3rd-party gas dig-ins	PG&E set a third-party dig-In target of 0.92 dig-ins per 1,000 tickets for 2022. In 2022, PG&E experienced 0.87 dig-ins per 1,000 tickets for third-party dig-ins.
Achieve a removal rate of pre-1985 pipe that limits asset age to 100 years by 2030	2013: 69 miles replaced 2014: 66 miles replaced 2015: 102 miles replaced 2016: 120 miles replaced 2017: 145 miles replaced(exceeded the target of 130 miles) 2018: 165 miles replaced (exceeded target of 163 miles) 2019: 126 miles replaced (exceeded target of 125 miles) 2020: 131 miles replaced (exceeded COVID-19 adjusted target of 125.6 miles) 2021: 191 miles replaced (exceed target of 189 miles) 2022: 203 miles replaced
Finalize legacy cross bore inspection scope by 2025 and re-establish the inspection timeline	PG&E has engaged a third-party on development of a quantitative and probabilistic approach to assess the risk of cross bores. The cross bore inspection optimization tool will assist in the determination of the scope and scale of cross bore risk and will support facilitating the prioritization of the location for cross bore inspections.
Reduce the size of emergency shutdown zones (ESZ) in areas that have significant exposure to external hazards by 2023.	PG&E has sustained installation of on average 100 ESZ valves annually since 2017. In 2022, PG&E received the closure letter from the National Transportation Safety Board (NTSB) regarding safety recommendations made to PG&E on August 10, 2021, as a result of an investigation of the February 6, 2019, PG&E third-party line strike and fire in San Francisco, California. One of the recommendations included: "Complete the integration of detailed location data into your hydraulic modeling software so that this information is readily available for all system assets when developing a valve isolation plan." The NTSB noted that PG&E fully completed integrating the ESZ information into the Gas Distribution GIS application, which will further improve the ability to provide detailed location information for valve isolation plans that require a full ESZ or multiple zones. The recommendations were closed on 4/21/2022 by the NTSB.
_____ (a) https://data.ntsb.gov/carol-main-public/sr-details/P-21-017.	

The Distribution Mains and Services Asset Management Plan describes these objectives in more detail.

f) Customer Connected Equipment

The Customer Connected Equipment Asset Family is composed of approximately 4.7 million gas meters and associated regulators, over-protection devices, shut-off valves, piping, and fittings that connect the gas distribution service to the customer. Customer meters are used to measure gas usage to support the billing function.

Figure 22 – PG&E Employee Working on Customer Connected Equipment

The Customer Connected Equipment Asset Management Plan provides an overview of the assets, threats to these assets, and efforts underway to manage these threats. The plan presents the asset inventory, an assessment of condition and overview of key risks to these assets. The plan also includes long-term strategic

objectives and an overview of the key programs in progress to mitigate these risks. The plan's key objectives are included in Table 7.

Table 7 – Key Customer Connected Equipment Metrics	
Overall Objective/Goal	**Progress Towards Goal**
Reach a steady state of 60,000 –70,000 pending non-hazardous meter set leaks for repair annually.[(a)]	2015 end of year inventory: 66,000 2016 end of year inventory: 63,113 2017 end of year inventory: 59,424 2018 end of year inventory: 84,571 2019 end of year inventory: 106,686 2020 end of year inventory: 152,698 2021 end of year inventory: 158,331 2022 end of year inventory: 159,565
Identify and remove problematic regulators by 2022	Over 1,600 replaced in 2015 Over 1,400 replaced in 2016 Over 800 replaced in 2017 Over 1,500 replaced in 2018 Over 1,500 replaced in 2019 Over 400 replaced in 2020 Over 700 replaced in 2021 Over 800 replaced in 2022 At the end of 2022, approximately 1,500 locations remain that are cannot get-in (CGI). These locations require special handling to resolve.

(a) PG&E's Meter Set Leak pending volume is forecast to increase until 2023, where a mitigation plan was proposed in PG&E's 2023 General Rate Case to begin decreasing the volume of meter set leaks at a rate that will decrease the volume year-over-year.

The Customer Connected Equipment Asset Management Plan describes these objectives in more detail.

g) Liquefied Natural Gas and Compressed Natural Gas

The Liquefied Natural Gas (LNG)/Compressed Natural Gas (CNG) asset family consists of portable assets that provide natural gas supplies utilizing either LNG and/or CNG to offset or supplement pipeline flowing supplies for planned outages, winter peak load shaving, unplanned outages, and in emergency situations. The LNG/CNG asset family consists of over 200 portable assets with also the inclusion of PG&E owned portable cross compression which is primarily utilized to move isolated methane to an adjacent pipeline reducing overall raw methane emissions during pipeline work. In 2022, there were no loss of containment incidents for portable assets [see Table 8].

Figure 23 – Portable Cross Compression Degassing Isolated Segment of Pipeline into Adjacent Line

Figure 24 – A Large-scale LNG injection Site in Dublin, CA supporting a planned gas outage

The LNG/CNG asset family also includes 32 CNG station assets to supply high pressure natural gas that fuels PG&E and third-party vehicles while also providing gas supply to our portable CNG assets. In 2014, PG&E instituted an industry-leading inspection program to assure the integrity of customer CNG vehicle fuel systems. In 2022, PG&E remained 100 percent compliant with PG&E owned natural gas vehicle fueling stations. Either the customer submitted their required three-year vehicle certificate of inspection, or the customer's fueling privileges were suspended until the inspection was completed. In 2022, there were no significant loss of containment incidents for CNG Station assets.

Table 8 – Liquefied Natural Gas/Compressed Natural Gas Asset Management Plan Strategic Objectives and Progress-to-Date	
Overall Objective/Goal	**Progress Towards Goal**
Driving towards zero significant LNG/CNG loss of containment incidents	2022 Activities: Continued maintenance, investments and upgrades of LNG/CNG equipment and assets. Continued LNG/CNG equipment training development and administering including adoption of LNG/CNG apprenticeship program. Continued improvements in quality control program to verify overall effectiveness of maintenance and training programs for LNG/CNG assets.
Implementing an industry-leading inspection program to improve safety inspection certifications to 100 percent of CNG fuel customer vehicles	2022: 100 percent of natural gas fueling customers authorized to fill at our facilities have submitted their three-year cylinder certification to ensure compliance with current Federal Motor Vehicle safety standards .
Reduce risk of portable natural gas transportation traffic incidents by reducing equipment issues through an improved maintenance program	2022: Continued maintenance of LNG/CNG portable over-the-road assets by dedicated fleet mechanics with Transportation Services. Hazardous material transport trailer quality control program continues to be in place to verify overall effectiveness of the below the deck maintenance program.

The LNG/CNG Asset Management Plan describes these objectives in more detail.

h) DATA

In 2018, PG&E Gas determined that creating an asset family specifically for data is consistent with industry best practice and will provide the appropriate attention and resources to the essential data sets required for the safe and efficient operation of PG&E's gas business. Data should be properly managed to have an appropriate life cycle, generation and disposal considerations, and quality control check points.

In 2020, PG&E established an Enterprise Data Management (EDM) organization and in 2022, the role of the Chief Data and Analytics officer (CDAO) was expanded to include the IT role of Chief Information and Security (CISO) officer now reporting to SVP and Chief Information Officer in IT. EDM retains the responsibility for developing the enterprise level data strategy, policies, standards, and objectives. Implementation of these objectives will be led by the Gas Data Management organization in partnership with the EDM team, our IT business partners, and Gas business units. Such centralization of the data management function ensures alignment of data strategies and improves PG&E's ability to make data-driven decisions around reducing risk within our systems.

PG&E contracted with Palantir to implement the Foundry enterprise data platform to centralize, curate, and transform data into business insights through creation of data products. Foundry currently is connected to 50+ Gas, Electric, and Customer Care focused source systems, which contain billions of records relevant to asset health analytics such as Geographic Information System (GIS) and SAP. The data platform does not replace the underlying source data systems of record, but rather provides a central platform to enable data integration/visualization and access and support for data management and advanced analytics. In 2022, the first of the reconciliation dashboards for SAP/GIS alignment were

developed in Foundry, enabling data stewards to visualize records in the two systems. Key metrics were established with IT and the EDM team.

Key Metrics are presented in Table 9. Strategic goals, and progress towards those goals are listed in Table 10.

Table 9 – Key Data Asset Metrics for 2022	
Overall Objective/Goal	**Progress Towards Goal to Date**
Complete Phase 1 certification for 21 data sets	• 21 Datasets completed **Target: 100%** **Actual: 100%** • 1094 CDEs collected **Target: 100%** **Actual: 100%**
Data Quality KPIs	1. At least 1 data quality rule applied (EDM KPI 1b): **Target: 50%** **Actual: 55%** 2. Overall coverage applicable to DQRs; Conformity, Uniqueness, Completeness (EDM KPI 2) **Target: 20%** **Actual: 38%** 3. Document publication of TD-5001S On Hold due to cancelation of GOV-9001S and Gov 9002S 4. % Complete of change management plan: **Target: 100%** **Actual: 91.67%**

Table 10 – Data Asset Management Plan Strategic Objectives and Progress to Date	
Overall Objective/Goal	**Progress Towards Goal**
Implement Data Stewardship in an evolving Enterprise Data Strategy environment and issue TD-5001S by end of Q3 2022.	• Metadata collection pilot: Engaged 9 data stewards Creation of repeatable processes for metadata collection Creation of certification process for critical data assets Continuous improvement: Automated parts of certification processes Contribution of best practices to Enterprise Metadata Template • Total number of Data Stewards Identified so far: Data Stewards: 20 SMEs: 29 Estimated hours of SME time we've used so far: ~3400 Includes UAT hours for Foundry, requirements meetings, metadata collection pilot, and metadata collection for data sets Business Data Stewardship training developed with Enterprise Data Management team. Data Stewards Trained in repeatable processes: 5 Documented internal standard work for the processes we've created • GOV-9001S and GOV-9002S were canceled in 2022 year, impacting the publication of TD-5001S, which is now pending the republication of those Standards.
Mature the framework to assess data risk for Gas by the end of 2023.	• Developed a process for calculating data quality scores in Foundry that is scalable and at speed • Doing investigatory work with IT to develop the data quality dimensions beyond the core three (Uniqueness, Completeness, Conformity) to understand how gas data sets will be measured by these advanced dimensions (Timeliness, Accuracy, Synchronicity, Consistency).
Develop 5-year vision for the data asset family that includes the use of an advanced data analytics platform.	• Tentatively targeting end of Q1 2023 for completion.
Develop and execute an annual portfolio of data quality improvement projects with supporting processes and do so in a way that is strategic, and risk informed.	• Compared critical data sets from SAP/GIS source systems. • Developed and implemented reconciliation dashboards in Foundry.

The Data Asset Management Plan describes these objectives in more detail.

3. Risk Management Process

Transporting natural gas involves moving a flammable product under pressure. As a result, risk management is an important part of the natural gas business. PG&E's Enterprise and Operational Risk Management (EORM) team prioritizes risks based on how likely an incident is to occur and how severe it might be. While the hazards and risks associated with natural gas are inherent, multiple layers of protection placed on top of one another safeguard against the failure of any one layer. Therefore, PG&E builds in multiple layers of protection into Company processes and plans.

To identify and address risk, PG&E follows a comprehensive enterprise and operational risk management process. PG&E's EORM plans allow PG&E to manage assets and risks at an enterprise and

operational level. PG&E defines "Enterprise Risk" as any risk that could potentially have a catastrophic impact to the company. PG&E's Board of Directors (BOD) provide oversight for Enterprise Risks through annual and ad-hoc risk reviews.

All operational risks are actively managed at the Functional Area level, with oversight provided by each Functional Area's Risk and Compliance Committee (RCC), which at a minimum, meet quarterly. The Gas RCC meets monthly. Each Functional Area's RCC is charged with oversight of risk management activities within the Functional Area including, but not limited to, reviewing risk assessments, approving risk response plans, and overseeing their implementation. By assessing and managing risks from PG&E BOD and Gas RCC management, PG&E can better manage the interdependencies and drive for consistency in risk management across the Company. In addition, the EORM team leverages several executive forums[14] to ensure governance of the EORM and awareness of enterprise risks across the executive team. The annual governance plan supports BOD oversight of Enterprise Risks and provides oversight for the remainder of the Corporate Risk Register. Elements of the work plan include risk management program strategy, deep dives, and challenge sessions for specific top risks. This process increases Senior Management and BOD engagement in risk-informed decision-making by involving them in decisions as the process unfolds, and gives those individuals charged with managing specific assets line of sight to other risks across the enterprise.

Gas identifies, assesses, and ranks its risks in a Corporate Risk Register in accordance with the EORM guidelines. The Gas risks within the Corporate Risk Register are governed by the Gas RCC. Gas risks can be communicated to PG&E's executive leadership team at the Public Safety Risk Council. Risks, including the key risks for each asset family identified during an annual risk refresh, are captured within the Asset Management Plans, mitigation programs, and work projects. As the result of the annual risk refresh process, Gas identified nine operational risks as part of the Corporate Risk Register for 2022, which were not changed from 2021. These risks are summarized in Table 11 below.

Table 11 – 2022 Gas Risks in the Corporate Risk Register	
Risk	**Description of Risk and Risk Drivers**
Loss of Containment on Gas Transmission Pipeline	Failure of a gas transmission pipeline resulting in a loss of containment, with or without ignition, that can lead to significant impact on public safety, employee safety, contractor safety, property damages, financial losses, and the inability to deliver natural gas to customers. Drivers Include: Equipment Failure, External/Internal Corrosion, Incorrect Operations, Manufacturing Defects, Stress Corrosion Cracking (SCC), Third Party/Mechanical Damage, Weather Related and Outside Force Threats, and Construction Threats.
Loss of Containment on Gas Distribution Main or Service	Failure of a gas distribution main or service resulting in a loss of containment, with or without ignition, that can lead to significant impact on public safety, employee safety, contractor safety, property damages, financial losses, and the inability to deliver natural gas to customers. Drivers include: Equipment Failure, Corrosion, Incorrect Operation, Excavation Damage, Material Failure of the Distribution Pipeline or Weld, Natural or Other Outside Force, and Crossbore.
Large OP Event Downstream of Gas Measurement & Control Facility	Failure of a Gas M&C facility to perform its pressure control function resulting in a large OP event downstream that can lead to significant impact on public safety, employee safety, contractor safety, property damages, financial losses, and the inability to deliver natural gas to customers. Drivers Include: Equipment Related and Incorrect Operations.
Loss of Containment on Gas Customer Connected Equipment	Failure of gas customer connected equipment resulting in a loss of containment, with or without ignition, that can lead to significant impact on public safety, employee safety, contractor safety, property damages, financial losses, and the inability to deliver natural gas to customers. Drivers Include: Corrosion, Equipment Failure, Incorrect Operation, Material/Weld Fail, Natural or Other Outside Force.
Loss of Containment at Natural Gas Storage Well or Reservoir	Failure at a gas storage well or reservoir resulting in loss of containment, with or without an unplanned ignition, that can lead to significant impact on public safety, employee safety, contractor safety, property damages, financial losses, and the inability to deliver natural gas to customers. Drivers Include: 1st/2nd/3rd Party Mechanical Damage, Incorrect Operations, Casing Wall Loss, Equipment Related, Manufacturing Related Defects, Weather Related/Outside Forces, and Welding/Fabrication Related.
Loss of Containment at Gas M&C or Compression and Processing Facility	Failure at a Gas M&C or Compression and Processing station resulting in a loss of containment that can lead to significant impact on public safety, employee safety, contractor safety, property damages, financial losses, and the inability to deliver natural gas to customers. Drivers Include: Incorrect Operations, Welding/Fabrication Related, External/Internal Corrosion, SCC, Third-Party/Mechanical Damage, Weather Related/Outside Forces, Manufacturing Related Defects, and Equipment Related.
Loss of Containment on CNG Station Equipment	Failure of CNG station equipment during operations resulting in a loss of containment that can lead to significant impact on public safety, employee safety, contractor safety, property damages, financial losses, and the inability to deliver natural gas to customers. Drivers include: Third Party Damage, Equipment Related, Incorrect Operations, and Corrosion.
Loss of Containment on LNG/CNG Portable Equipment	Failure of LNG/CNG portable equipment during operations resulting in a loss of containment that can lead to significant impact on public safety, employee safety, contractor safety, property damages, financial losses, and the inability to deliver natural gas to customers. Drivers include: Equipment Related, Incorrect Operations, Corrosion.
Insufficient Capacity to Meet Customer Demand	Failure to maintain capacity on the system on high demand days. Drivers include: Pipeline Outage, Integrity Finding, Delayed/Deferred Capacity Projects, Inadequate Design, Design Deviation, and Unexpected System Restriction.

Factors impacting more than one risk as a unique risk driver, or a component of an existing risk driver, are called Cross-Cutting Factors. As such, these factors can impact the likelihood or consequence of a risk

event. The Cross-Cutting Factors are owned by a single functional area, with other impacted functional area providing their input and subject matter expertise. These factors also follow the EORM process. Gas is impacted by several Cross-Cutting Factors owned by other functional areas as displayed in Table 12 below.

Table 12 – Enterprise Risk Management: Cross-Cutting Factors

Cross-Cutting Factor	Description
Seismic	Seismic events can be a significant driver of failure in all functional area assets. Seismic events contribute to the likelihood of asset failure events and to the associated safety, reliability and financial consequences of those events.
Cyber Security Incident	A coordinated malicious attack purposefully targeting PG&E's core business functions, resulting in loss of control of Company information or systems used for gas, electric, or business operations. The consequences of a cyber attack are potentially catastrophic and could impact the safety and reliability of PG&E's operational systems.
Skilled and Qualified Workforce	Impact of human performance, workforce continuity, and employee skills and qualifications that affect PG&E's risk drivers and consequences.
IT Asset Failure	Failure of IT systems or infrastructure, resulting in outages, or system unavailability for mission critical assets impacting operations, or the ability to support public safety events.
Records and Information Management (RIM)	The risk of not having an effective RIM program may result in the failure to construct, operate and maintain a safe system and may lead to property damage and/or loss of life.
Physical Attack	Incidents related to break-ins, vandalism, theft, fraud, assault, and threats against PG&E's workforce and assets.
Emergency Preparedness and Response	Examines the drivers and consequences of inadequate planning or response to catastrophic emergencies. Inadequate emergency planning or response could have significant safety, reliability, and regulatory impacts.
Climate Change	Climate change presents ongoing and future risks to PG&E's assets, operations, employees, customers, and the communities in which it serves.

Through external regulatory changes, PG&E continues to improve its risk management process. PG&E is an active participant in the CPUC's proceedings to advance a "risk-informed" process. In D.14-12-025, the CPUC adopted a risk-based decision-making framework into the Rate Case Plan for energy utilities. The framework includes the Safety Model Assessment Proceeding (S-MAP) and the Risk Assessment and Mitigation Phase (RAMP). S-MAP's focus is on the models each utility is using to evaluate risk with the intent of developing a single model for all utilities. RAMP's focus is on risk mitigation, alternatives analysis, risk spend efficiency, and a quantitative measure of expected risk reduction. PG&E filed its 2020 RAMP report on June 30, 2020, which is the initial phase of PG&E's 2023 General Rate Case. The 2020 RAMP report represents progress on the joint efforts of the Commission and its Safety Policy Division, PG&E, California's other large investor-owned utilities, and other stakeholders over the past several years to enhance risk-informed decision-making through the S-MAP and RAMP reports. The RAMP report reflects PG&E's first implementation of the methodologies adopted in the S-MAP Settlement Decision (D.18-12-014).

On December 15, 2022, the CPUC issued Decision (D.) 22-12-027 on Phase II of the Order Instituting Rulemaking to Further Develop A Risk-Based Decision-Making Framework (RDF) for Electric and Gas Utilities (R.20-07-013). This Decision replaces the previous 2018 S-MAP Settlement Agreement with a

modified Risk-Based Decision-Making Framework document that details the minimum requirements for an IOU's RAMP report. A key change in the decision is a shift from a Multi-Attribute Value Function (MAVF) approach to a Cost-Benefit Approach that includes standardized dollar valuations of safety, electric reliability, and gas reliability consequences from risk events. This change, along with other RDF refinements made in the decision, are intended to further increase transparency, participation, and accountability into how safety risks for energy utilities are managed, mitigated and minimized. PG&E will be implementing the new requirements from this decision into its next RAMP Report scheduled to be filed in May 2024.

4. Records and Information Management

PG&E's Enterprise Records and Information Management (ERIM) Program focus is to reduce risk and increase trust in the company's information and records by providing clear governance, change management and process improvement, and effective technology and tools. This includes deployment of consistent, integrated processes that support records development associated with operational safety, regulatory compliance, and knowledge management. ERIM works with all of PG&E to assess and inventory physical and electronic records and implement tools to manage the lifecycle of records. Examples of ERIM accomplishments in 2022 include:

- Continued physical records remediation in field offices and provided local support during decommissioning and reconfiguration of PG&E sites;
- Monitored Gas' maintenance of Information Governance Maturity Model (IGMM) level 3 maturity, as assessed by Lloyd's Register;
- Closed the Gas Transmission Recordkeeping OII remedy PricewaterhouseCoopers LLP (PwC) E.7 to analyze and mitigate 71 Gas Transmission shared drives satisfying the requirement to identify and migrate, where applicable, official records stored on network Shared Drives. Mitigation solutions included: Zasio manage-in-place, migration of content to SharePoint Online or ProjectWise, reference managed in shared drives, ROT content planned for deletion, or hybrid approach. Completed classifying records and identified Redundant, Obsolete, and Trivial (ROT) content for planned deletion;
- Migrated eight million Gas Pathfinder records from Documentum on-prem to CRM Cloud; an additional four applications with over two million records were migrated to CRM Cloud: Compliance and Risk Management (CCMS), Electric Operations Records of Work (EOROW), Gas Operator Qualifications, Gas – Distribution As-Built Records (GDARC);
- Completed all actions in Gas' Information Governance Maturity Model (IGMM) Action Plan and maintenance activities were identified for continued monitoring;
- Performed an ERIM Program Compliance (EPC) assessment on Materials Traceability; and

- Destroyed 276 Gas boxes through the physical records disposition process.

The Community of Records Advocates (CORA) formally known as the RIM Ambassador Network, composed of ERIM staff and representatives from Gas and other Functional Areas continues to be an effective way of communicating records management information and best practices throughout the organization. In addition to the mandatory information and records training that all PG&E employees receive, the ERIM team provides monthly training and discussions on general information and records management practices through their Knowledge Center course offerings. These offerings are available to all PG&E employees. Additionally, ERIM field personnel support all Functional Areas and all regions throughout PG&E by providing records management training and guidance.

ERIM maintains comprehensive 5-year roadmaps listing projects and initiatives that support our mission and goals. Table 13 highlights key ERIM projects and programs, with the drivers for work impacting the Gas functional area in 2023.

Table 13 – Gas Records and Information Management Roadmap Highlights

Roadmap Projects & Programs	Roadmap Drivers
Documentum Repository Consolidation	• Documentum stability and support, improved functionality, and new features • Simplified data structure to support functional implementation • PG&E's Records Information Management standards (GOV-7000 series)
ERIM Program Compliance	• ARMA International's Information Governance Maturity Model (IGMM) • PG&E's Records Information Management standards (GOV-7000 series) • California Privacy Rights Act (CPRA)
Physical Records Disposition Execution	
Data Disposition	

5. Mitigating the Risk of Loss of Containment

PG&E takes a proactive approach to reducing the risk of loss of containment or the unintended release of natural gas. The mitigation programs and projects to address loss of containment vary significantly in size and scope, from actively promoting "Call Before You Dig" and installing pipeline markers over the assets as visual identifiers, to inspecting, testing, and replacing assets that may be deemed beyond their useful lives. PG&E remains focused on identifying the right work to protect the public from a loss of containment incident.

a) Damage Prevention

Damage Prevention consists of multiple workgroups collaborating to educate excavation contractors and homeowners about safe excavation practices near underground infrastructure. Activities, reviewed annually and described in the next sections, include Public Awareness, Dig-in Reduction Team (DiRT), Locate and Mark, Standby Governance and Pipeline Patrol.

Damage Prevention includes marking the field location of underground facilities as requested through the Underground Service Alert (USA) system (commonly referred to as 811), USA ticket management, investigations associated with dig-ins and damage claims, monitoring excavations in proximity to critical infrastructure, and Public Awareness. The marking of underground utilities is governed by California Government Code Section 4216 et seq. and the process is driven by regulatory requirements and industry best practices. Table 14 describes other key Damage Prevention programs.

Table 14 – Damage Prevention Programs	
811 Ambassador	The 811 Ambassador Program provides a response mechanism for PG&E employees to take corrective action when they observe excavation with no delineation or markings. All PG&E employees are 811 Ambassadors. Employees learn how to identify excavation-related delineations and utility operator markings as required by the California One Call Law. If an employee observes excavation without the required marks, they call the Damage Prevention Hotline and in response, a DiRT member is notified to assess whether the excavation complies with California's One Call Law. If the excavation is found to be in non-compliance with California's One Call Law, the DiRT member takes several actions. They request all excavation be stopped, educate the excavator about the requirements of California's One Call Law and the reason for the non-compliance, provide excavation safety materials, and instruct the excavator to correct the non-compliance activity prior to continuing any excavation. In 2022, the Damage Prevention Hotline received 756 calls.
Gold Shovel Standard	PG&E has participated in the Gold Shovel Standard (GSS) since its creation. PG&E began this program which has transitioned to a third-party and was available to utilities across the nation. GSS became an internationally recognized program, with companies in Canada adopting and implementing its certification requirements. In April of 2022, The Common Ground Alliance (CGA) announced a merger with the GSS and rebranding to the Damage Prevention Institute (DPI). The program will continue to set safety criteria that second-party contractors are required to meet to be eligible to do work on behalf of the Utility. DPI is one way that PG&E is making its own communities safer, but also bringing best safety practices to the industry. PG&E requires contractors excavating on behalf of PG&E to maintain the Gold Shovel certification through GSS and transition to DPI certification as it becomes available in 2023. PG&E acknowledges all contractors who practice safe excavation and monitors offenders who fail to demonstrate safe practices. Unsafe contractors are unable to perform work on behalf of PG&E.
Procedures, Guidance and Training	Providing clear and concise instruction around dig-in prevention measures like troubleshooting "difficult to locate" facilities, documenting field activities and how to properly respond to a USA ticket.

In addition, since 2014, PG&E has improved its "Shut-In The Gas Performance", which tracks the company's ability to quickly stop the flow of gas when the company is notified of potentially dangerous public safety events such as dig-ins, impacts to meters from vehicles, pipe ruptures, explosions, or material failures. The Shut-In The Gas Performance specifically measures the number of minutes required for a qualified PG&E responder to arrive onsite and stop the flow of gas from PG&E's distribution network. PG&E measures performance for damages impacting either gas service lines or meters/risers (Services) or damages impacting gas mains. Plan of Reorganization (D.20-05-053) called for the development of Safety

and Operational Metrics to be used in conjunction with the adopted Enhanced Oversight and Enforcement Process to ensure progress is being made on key safety and operation metrics. In 2022, PG&E began reporting the median Shut-In The Gas Performance versus the average. PG&E's median Shut-In The Gas Performance was 36.8 minutes for services and 82.1 minutes for mains.

Table 15 – Shut-In The Gas Performance (median number of minutes)

	2014	2015	2016	2017	2018	2019	2020	2021	2022
Services	38.0	40.0	37.0	36.0	37.2	36.8	36.7	36.3	36.8
Mains	97.0	87.0	87.0	89.0	76.1	76.0	79.2	79.1	82.1

Since 2014, PG&E has improved its overall make safe performance on events involving services by 3 percent, and events involving mains by 17 percent.

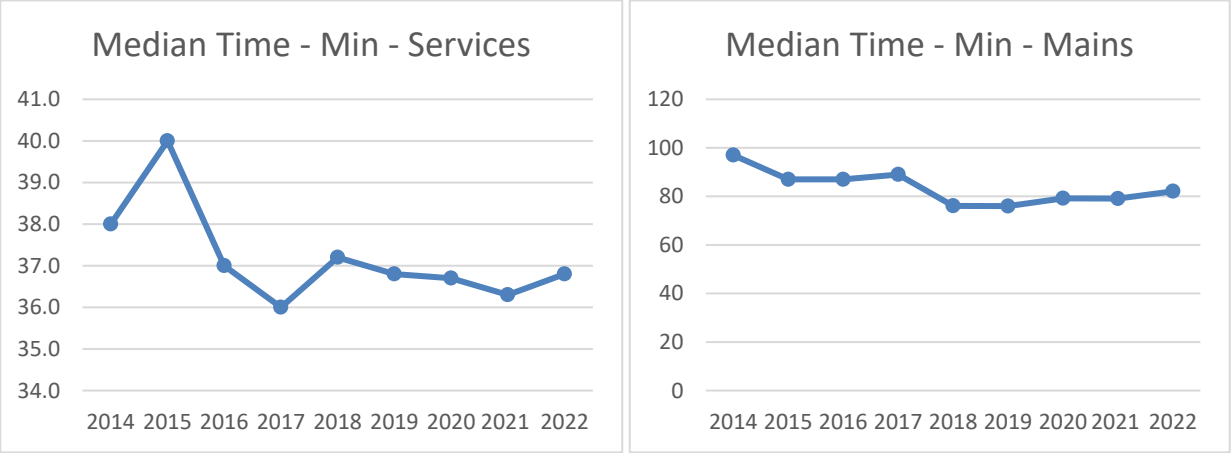


Figure 25 – Shut-In The Gas Performance

PG&E will continue its efforts to improve its Shut-In The Gas Performance. In addition to Shut-In the Gas performance, PG&E began measuring the Time to Resolve Hazardous conditions in 2022 as part of the Safety Operational Metrics. This metric measures the median response time to resolve a Grade 1 leak. PG&E's median Time to Resolve Hazardous Condition performance was 165.3 minutes for 2022.

i. Public Awareness

PG&E's Public Awareness Program conducts educational outreach activities for excavators, local public officials, emergency responders, and the public who live and work in PG&E's service territory. The program communicates safe excavation practices, required actions prior to excavating near underground pipelines, availability of pipeline location information, and other gas safety information through a variety of methods throughout the

PG&E conducted 184 "811 Call Before You Dig" contractor workshops, reaching 3,853 attendees at 185 companies

Figure 26 – Screenshot of 811 Awareness Social Media Post

year including bill inserts, e-mails, brochures, mass media advertising and press releases. 2022 saw an easing of COVID-related meeting restrictions, which allowed for increased participation in community meetings, events and excavator trainings.

PG&E communicates gas safety information multiple times each year, and in 2022, reached approximately 3 million paper bill customers and sent approximately 3 million e-mails to those customers who receive paperless billing. In addition to the bill inserts and e-mail campaigns, PG&E also sent a targeted direct mail piece to over 330,000 non-PG&E customers within 1,000 feet of a PG&E gas transmission pipeline, explaining their proximity to the transmission line, information about how to locate nearby gas pipelines, damage prevention measures (811), how to identify gas leaks, and what to do in the event of a gas leak. Additional targeted mailings were sent to school administrators, excavators, emergency responders, public officials, landscapers, sewer and plumbing companies, farmers, master meter accounts, and those who live or work near PG&E's storage and compressor facilities. Table 16 identifies highlights from the Public Awareness Program's 2022 activities.

Table 16 – Public Awareness Highlights
Continued posting weekly 811 awareness messaging on the NextDoor app, targeting zip codes where pipeline damages were caused by homeowners who did not have a one-call ticket, resulting in over 770,000 impressions.
Executed 11 different social media campaigns targeting homeowners and contractors throughout PG&E's service territory, promoting the importance of calling 811 before digging. These campaigns resulted in over 7.8 million impressions.
Conducted monthly webinars during peak digging months, outlining the process for calling 811 and why making the call is so important. Held 12 webinars, which had over 300 attendees. One of the webinars was recorded and is posted permanently on www.pge.com/811 for customers to view at any time.
Completed 16 bilingual 811 workshops, with 442 participants (farm workers), in partnership with local Spanish language radio stations. Conducted an interview with each radio station to further expand on the 811 free service.
Continued to conduct targeted outreach in cities with a high number of dig-ins. The outreach included job site visits, 811 training for top damaging companies and meeting with local leadership to discuss continued partnership for community safety. These targeted efforts resulted in over 6,982 field visits by Dig-in Reduction Team (DiRT) Investigators.

ii. Dig-In Reduction Team

PG&E continues to push for improved performance in dig-in prevention by conducting factual investigations of excavation damage to PG&E's facilities, identifying process improvements to reduce damages, and actively pursuing cost recovery from excavators responsible for excavation damage. The DiRT is part of a proactive program that directly and positively affects public and employee safety by striving to reduce the number of excavation damage incidents through outreach, education, and incident investigations. PG&E's Dig-In Reduction programs were instrumental in managing the number of third-party gas dig-ins per 1,000 USA tickets at 1.04 in 2019, 1.05 in 2020, 0.91 in 2021 and 0.87 in 2022. This is PG&E's lowest third-party dig-in rate since PG&E has tracked this metric starting in 2010.

Table 17 below provides information on some dig-in prevention projects or process improvements.

Table 17 – Dig-In Reduction Team Programs Under Damage Prevention	
PG&E's Commitment to Safety	**Promoting Safety**
DiRT Investigations	Deploys investigators to oversee and enhance PG&E's ability to investigate dig-ins, patrol active excavations, and intervene when unsafe excavation activities are identified.
Pipeline Patrol	Identifies and intercepts surface threats to the transmission system via aerial and ground patrolling. Pipeline Patrol notifies DiRT as needed. DiRT will perform tasks listed above, as appropriate.
811 Workshops	Conduct safe digging workshops throughout the service territory.

Note: Beginning January 1, 2016, contractors who wish to excavate or subcontract out excavation work for PG&E must obtain GSS Certification by making a commitment to safe digging practices in accordance with the California "One Call Law" (California Government Code 4216) and the CGA best practices for excavation.

iii. Locate and Mark Program

The Locate and Mark Program is designed to mitigate the potential risk of damage to underground facilities by identifying and marking assets for potential excavators within a 48-hour window. Federal pipeline safety regulations[15] and California state law[16] require that PG&E belong to, and share the cost of operating, the regional "one-call" notification system. Builders, contractors, and others planning to excavate, must use this system to notify underground facility owners, like PG&E, of their plans to excavate. PG&E then provides the excavators with information about the location of its underground facilities, including natural gas, electric, and fiber optic. Information is typically provided by having a PG&E locator visit the work site and place color-coded surface markings to show where underground pipes and wires are located. Because of its large service territory, PG&E belongs to two regional notification centers which share a common toll-free, 3-digit "811" telephone number. The California one-call systems are commonly referred to as USA. In 2022, PG&E received over 1.58 million USA ticket notifications.

PG&E has been, and continues to be, on a mission to improve its safety, compliance and ethics culture and to foster a non-retaliatory environment where all employees can confidently and safely speak up. Leaders are consistently listening to and following up on issues raised by employees. PG&E is steadfastly committed to this important work.

iv. Pipeline Patrol

Pipeline Patrol is a federally required activity that is essential to protect the integrity of PG&E gas transmission facilities from external threats. The activity helps to increase public safety. Patrol is performed both aerially and by ground operator-qualified personnel who observe surface conditions on or near the surface of buried pipelines. Patrollers identify and respond to excavation activity (e.g., digging, ripping, boring, blasting etc.) in order to notify excavators they are digging in the vicinity of pipelines, and in the case of unauthorized digging, to advise use of the Underground Service Alert System.

Figure 27 – Example of Land Movement

Patrollers also report on surface conditions that could cause damage to company facilities, such as land movement, or could cause a change in class location, such as new construction that may affect identification of High Consequence Areas.

Figure 28 – Patrol Fixed Wing Aircraft

PG&E primarily utilizes aerial methods to conduct patrols, with ground personnel dispatched to investigate observations made from the air. Special patrols may also be performed following natural disasters or other incidents as necessary. Aerial patrols provide real-time knowledge of on the ground activities, and the surveillance helps PG&E to identify and stop unsafe excavation practices before dig-ins occur.

Figure 29 – 2022 Patrol Project

PG&E patrols using a combination of fixed-wing aircraft and helicopters. In 2022, 56 percent of aerial observations were related to excavation, 34 percent were related to new construction, and the remaining 11 percent were related to include right of way (ROW) encroachments, geohazards, and pipeline damages.

b) Pipeline Markers

Pipeline markers and indicators are important damage prevention tools used to indicate the approximate locations of pipelines along their routes to prevent "dig-ins" from occurring. The markers and indicators also advise the public of pipeline rights of way. Pipeline safety regulations require installation of markers because markers contribute to public awareness and damage prevention, which in-turn reduce the risk of loss of containment.

Pipeline Markers are signs on the surface above or near the natural gas pipelines located at frequent intervals along the pipeline ROW. The markers are typically found at various important points along the pipeline route including highway, railway, navigable waterway intersections, spans, angle points (bends), and other road crossings. These markers display the name of the operator and a telephone number where the operator can be reached in the event of an emergency. They are meant to be highly visible along the ROW and appear in different forms as the examples in Figure 31.

Figure 30 – Pipeline Marker Near Excavation Site

Figure 31 – Types of Pipeline Markers

In the event of an emergency or natural disaster, markers may be the only indication to the public and emergency responders that natural gas pipelines are in the area, subject to third-party removal or damage, despite being properly installed.

c) Distribution Pipeline Replacement

As shown in Table 18, PG&E has three pipeline replacement programs: Gas Pipeline Replacement Program (GPRP), Plastic Pipe Replacement Program, and Main Replacement Reliability Program. An important element of providing safe gas distribution service is replacing aging or at-risk assets. PG&E uses relative risk in prioritizing its pipeline replacement projects so that the sections of pipe with the highest risk are replaced first. The risk ranking for the Plastic Pipe Replacement Program is based on a methodology that considers leak history, pipe age, material type, ground temperature, diameter, operating pressure, and population proximity. The risk ranking for the Gas Pipeline Replacement Program (GPRP) is based on a methodology that considers pipe age, leak history, cathodic protection, coating, seismic activities, and population proximity. In addition to gas main replacement, the programs cover related service replacement and meter relocation work.

PG&E's objective is to achieve a removal rate (replacement or decommissioning of pipe) of pre-1985 pipe that limits asset age to nearly 100 years by 2030. Assuming this removal rate, all remaining miles of known pre-1985 Aldyl-A and other plastic pipe are anticipated to be removed by 2053, which is closely aligned to mitigate all 1976-1984 plastic pipe prior to its 71-year mean-time-to-failure shown in the CPUC's analysis in its "Hazard Analysis & Mitigation Report on Aldyl A Polyethylene Gas Pipelines in California" report.

Table 18 – Distribution Pipeline Replacement

Gas Pipeline Replacement Program	Plastic Pipe Replacement Program	Main Replacement Reliability Program
PG&E began the GPRP Program in 1985, which has focused on the replacement of cast iron and pre-1941 steel pipe and has enabled PG&E to deactivate all known cast iron main (over 830 miles of pipe). GPRP is now focused on replacing pre-1941 steel pipe; however, PG&E may also include post-1940 higher risk steel projects based on risk modelling. In 2022, the GPRP Program replaced 23.6 miles of pipe.	Since PG&E began its Plastic Pipe Replacement Program in 2012, PG&E has replaced about 900 miles. In 2022, 163.9 miles of pre-1985 plastic pipe was replaced. PG&E continues to increase the replacement of pre-1985 plastic pipe year over-year in recognition of the approximately 6,200 miles of known inventory.	The Main Replacement Reliability Program focuses on the replacement of pipeline not covered by the GPRP or pre-1985 plastic pipe replacement programs. In 2022, PG&E replaced 15.5 miles of distribution pipe through this program.

Figure 32, below, demonstrates the company's main replacement progress from 2010 to 2022.

Main Replacement 2010-2022 Actuals															
Program			2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
14A	GPRP	Replacement of all cast iron and some steel main installed pre-1940	24.8	28.1	23.4	31.6	26.8	27.5	30.4	35.8	43.6	20.0	24.4	36.9	23.6
14D	Aldyl-A	Replacement of Aldyl-A plastic and similar plastic installed pre-1985	0.0	0.0	17.6	30.7	32.5	63.5	80.4	95.1	91.2	90.0	87.4	136.3	163.9
50A	Reliability	Replacement of gas facilities that have reliability concerns but do not qualify for replacement under the GPRP or Aldyl-A Plastic Replacement Programs	3.7	6.4	7.9	8.2	6.6	13.7	15.8	14.1	28.6	16.0	19.2	18.2	15.5
Total			28.4	34.4	48.9	70.5	65.9	104.7	126.6	145.0	163.4	126.0	131.0	191.4	203.0
Trend				21%	42%	44%	-7%	59%	21%	15%	13%	-23%	4%	46%	6%

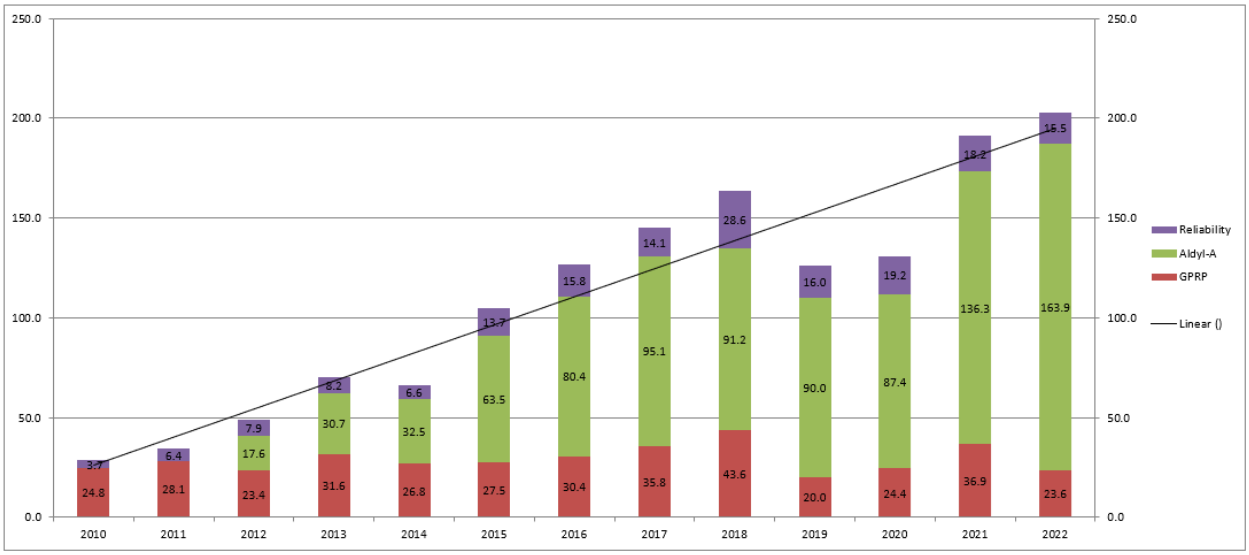


Figure 32 – Main Replacement Progress 2010-2022 (in miles)

d) Cross-Bore Mitigation

A cross-bore[17] is a gas main or service that has been installed unintentionally, using trenchless technology, through a wastewater or storm drain system. PG&E has an inspection program to identify and remediate gas cross-bores, and a public outreach program that provides safety information to PG&E customers, sewer districts, and public works agencies. In addition, PG&E has implemented a Gas Cross-Bore Inspection Program that uses video camera inspections to verify no damage has occurred to sewer lines when using trenchless construction methods on new construction projects.

Cross-Bore Statistics			
Year	Inspections Completed	Cross Bores Found	Inspections Planned
2013	19,298	148	25,000
2014	35,895	188	38,000
2015	23,530	100	24,000
2016	22,981	94	23,570
2017	35,628	55	30,000
2018	46,043	46	42,500
2019	44,213	37	41,636
2020	16,814	56	15,000
2021	28,092	33	27,532
2022	49,705	29	48,500

Figure 33 – Cross-Bore Statistics

The goal of PG&E's Cross-Bore Inspection Program is to identify cross-bores by completing inspections of potential conflict locations and repairing all occurrences as they are discovered. PG&E completed approximately 49,705 inspections in 2022. This is the highest number of cross-bore inspections PG&E has completed in any given year. In 2022, PG&E found approximately 1 cross-bore per 1,714 inspections.

e) Strength Testing

PG&E's transmission pipeline strength testing program is designed to allow PG&E to find pipeline defects that could subsequently cause a rupture or leak, and then repair these defects or anomalies in the pipeline. The strength testing takes a pipeline out of service, clears it of gas, cleans it internally, then fills it (typically with water) to pressures consistent with and pursuant to 49 CFR, Part 192, Subpart J testing and documentation requirements or Minimum Test Pressures for Existing Pipelines in High Consequence Areas (HCAs) to meet the Seven Year Integrity Assessment Interval per American Society of Mechanical Engineers (ASME) B31.8S-2004, Section 5, Table 3. This process also results in a test record that establishes the operating pressures the pipe can withstand. A secondary benefit of strength testing for PG&E is that the pipeline is typically upgraded to allow for navigation of the cleaning tools (pigs), allowing PG&E to run ILI tools at later dates [see Section IV.5.g *In-Line Inspection*]. Thus, strength testing is one tool PG&E uses to maintain the margin of safety for the transmission pipeline and reduce the likelihood of future loss of containment incidents that could pose a risk to public safety.

Figure 34 – Strength Test in Progress

PG&E continues to strength test or replace untested transmission pipelines in compliance with Pub. Util. Code Section 958. In 2022, PG&E completed approximately 24 miles of strength testing (Table 19), of which 6.7 miles were re-tested for specific Integrity Management (IM) purposes. This work brings PG&E to a total of approximately 1,591 miles strength tested since 2011 which is approximately 92 percent of our transmission pipeline system. The pipeline miles strength tested in 2022 were prioritized based on a risk informed mix of integrity management threats and testing untested pipe lacking a traceable, verifiable, and complete record to meet the NTSB D.11-06-017 requirements.

Table 19 – Strength Testing Program

Strength Test (miles)	2011-2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Total
PSEP	539	135	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	674
Subsequent Testing	0	0	79	89	253	286	115	39	32	24	917
Total	**539**	**135**	**79**	**89**	**253**	**286**	**115**	**39**	**32**	**24**	**1,591**

PG&E will continue to utilize strength testing to address NTSB commitments (D.11-06-017) and re-assess pipeline segments with integrity management threats for both manufacturing related defects and time dependent corrosion threats.

f) Vintage Pipe Replacement

A significant portion of PG&E's natural gas transmission pipeline system, approximately 47 percent, was designed, manufactured, constructed, and installed before the advent of California's 1961 pipeline safety laws. While age alone does not pose a threat to pipeline integrity, PG&E has determined, consistent with industry practice, that some vintage pipeline features, pipelines with certain welds, bends, and fittings located in areas subject to land movement, are most appropriately managed through replacement.

In 2019, PG&E refreshed its program information using new risk results from the previous year. This update continued our strategic risk prioritization approach to replace pipe where PG&E defines high-risk land movement areas, prioritize projects based on total risk, and define pipe with lower risk that can be monitored for risk change through our ILI and Geohazard programs in lieu of replacement or retirement. Based off this risk methodology and updated risk results, PG&E has now identified approximately 123 miles (Tier 1 and Tier 2) of transmission pipe.[18] Of those 123 miles identified, PG&E has further identified approximately 118 miles (Tier 1) of high risk pipe for replacement or retirement where vintage fabrication and construction threats interact with high likelihood of land movement in populated areas.[19] Additionally, PG&E is monitoring an additional 1,542 miles of pipeline with vintage characteristics through the ILI and Geohazard programs. In 2022, approximately 0.15 miles of vintage pipe were replaced.

Figure 35 – Vintage Pipe Replaced in San Mateo

Table 20 – Vintage Pipe Replacement Program			
	Miles Replaced	Additional Miles Addressed	Percentage of High Risk Mileage Addressed[(a)]
Pre-2015	20.2 miles	1.3 miles	20 percent
2015	5.9 miles	12.7 miles	41 percent
2016	6.7 miles	8.8 miles	45 percent
2017	3.5 miles	11.5 miles	61 percent
2018	20.6 miles	0 miles	74 percent
2019	2.06 miles	0.75 miles	75 percent
2020	1.32 miles	0 miles	77 percent
2021	3.22 miles	0 miles	78 percent
2022	0.15 miles	0 miles	79 percent
Program Target:	123 miles		100 percent

(a) High risk mileage addressed includes pipeline retirements and mileage replaced in other pipe replacement programs from 2015-2021 that have the vintage threat.

As PG&E continues to monitor and assess characteristics of vintage pipelines interacting with land movement through improved data quality and collection, its replacement or retirements are prioritized by addressing sections of pipeline closest to highest density population areas with a high likelihood of ground movement. At PG&E's current and planned rate, the program will address the risk of pipe containing vintage fabrication and construction threats that interact with high risk of land movement for high population density areas by 2030.

g) In-Line Inspection

PG&E's ILI Program uses technologically advanced inspection tools, often called "smart pigs," to reliably assess the condition of transmission pipe so that action can be taken when issues are identified. Prior to running an ILI tool in a pipeline, a pipeline must be modified with installation of "launchers" and "receivers" to insert and remove the tool. Pipeline features that would obstruct the passage of the tool to make the pipeline piggable must also be replaced. After the pipeline is upgraded to accommodate an ILI tool, cleaning and inspection "runs" are conducted to collect data about the pipe. This data is analyzed for pipeline anomalies that must be remediated through the Direct Examination and Repair

Figure 36 – Electro Magnetic Acoustic Transducer (EMAT) Tool After an Inspection on Line 400

In-Line Inspection is the MOST RELIABLE pipeline integrity assessment tool currently available to natural gas pipeline operators to assess the internal and external condition of transmission line pipe.

process where the anomaly is exposed, examined and repaired as necessary. The information from Direct Examination and Repair is used to generate mitigation activities to improve the long-term safety and reliability of the pipeline.

As of 2022, approximately 49 percent of the PG&E gas system is piggable and a remaining 22 percent of the system is in scope for the Traditional ILI Upgrade program. In addition, PG&E inspected a total of 495 miles with 177 of those miles assessed with ILI for the first time. Much of PG&E's pipeline was installed decades before ILI was invented. Today, about 29 percent of the PG&E system is not capable of supporting the running of traditional ILI tools because of design elements like low pressure and/or low flows, small diameter pipelines, and short sections of pipeline or facility configurations, such as drips or blow downs.

h) Corrosion Control

All of PG&E's metallic assets are susceptible to corrosion—a natural, time-dependent process where metal degrades (rusts) due to its interaction with the environment. Gas transmission, storage, and distribution assets primarily composed of steel pipe carrying compressed natural gas may experience degradation due to External Corrosion, Internal Corrosion, or Stress Corrosion Cracking (SCC). External Corrosion is degradation of the pipe due to interaction of the steel with the atmosphere, soil (buried piping), and/or water (submerged piping). Internal Corrosion is degradation of the pipe due to interaction of the steel with the natural gas being transported or with unintended product such as water, solids, salts, etc. SCC is degradation of the pipe due to cracks induced from the combined influence of tensile stress[20] and a corrosive environment. The material degradation associated with all forms of corrosion may reduce the integrity of steel assets and threaten PG&E's ability to safely and reliably transport natural gas. PG&E assesses the risk of External Corrosion, Internal Corrosion, and SCC independently because each requires a different form of mitigation.

Figure 37 – PG&E Employee Installing a Cathodic Protection Rectifier

Given the risk profile associated with corrosion, PG&E has sought out highly qualified corrosion experts from around the country, enhanced procedures, and incorporated systematic, risk-infomed methodologies to its corrosion control approach. PG&E's efforts are resulting in more accurate data on which to make decisions related to the identification and mitigation of corrosion risks, improving the safety and reliability of PG&E's assets.

For example, PG&E mitigates the threat of External Corrosion by installing assets with appropriate coatings and by applying Cathodic Protection ("CP") to buried or submerged structures. CP mitigates

corrosion through administering direct current through the soil or water to steel piping. Coatings mitigate corrosion by forming a barrier between the steel and environment. As coating systems on buried and submerged piping systems cannot readily be inspected for degradation, the use of CP in conjunction with coatings provides additional protection for buried or submerged assets.

PG&E also monitors the level of cathodic protection on its assets and for conditions that may limit the ability to maintain adequate levels of CP on buried or submerged assets. Such conditions include contacted casings and electrical interference from electric transmission equipment, municipal rail systems, and other operators' corrosion control systems. Overall, corrosion control at PG&E consists of the programs included in Table 21.

Table 21 – Corrosion Control Programs

Program	Program Description
Atmospheric Corrosion	Addresses deterioration of coating systems on assets designed for above ground use. Program includes field inspections and mitigation.
Casings	Identifies and remediates contacted cased crossings.
CP New, CP Replace, 850 Off	Designs, installs, and maintains CP systems to prevent corrosion. In addition, PG&E has implemented a more conservative CP criterion for its transmission piping system.
Close Interval Survey	Collects CP readings at approximate three-foot intervals on transmission piping to verify levels of CP between established monitoring points.
Corrosion Investigations	Investigates the cause of corrosion control deficiencies and/or corrosion damage and recommends mitigating solutions.
Enhanced CP Survey	Evaluates distribution piping CP area boundaries, monitoring locations, protection status, and updates documentation to ensure proper operation of CP systems.
Electrical Interference – AC	Evaluates and mitigates the threat of alternating current interference on gas piping systems.
Electrical Interference – DC	Evaluates and mitigates the threat of direct current interference on gas piping systems.
Internal Corrosion	Evaluates and mitigates the threat of Internal Corrosion in gas pipelines.
Routine Maintenance	Routine monitoring of corrosion control system effectiveness, to include rectifier inspections and maintenance; pipe-to-soil monitoring, casing-to-soil monitoring, and atmospheric corrosion inspections.
Test Stations	Installs or replaces test stations in areas along the piping system where CP monitoring is required.

PG&E continues to advance in its goal of building a best-in-class corrosion control program by incorporating industry corrosion control standards, peer operator experience, third-party evaluations, and corrosion research into its standards and procedures. PG&E actively participates in corrosion research conducted by the Pipeline Research Council International (PRCI) and supports efforts to incorporate the results of such research into corrosion control regulations and standards through its participation in the Association for Material Protection and Performance (formerly National Association of Corrosion Engineers

(NACE) International and the Society for Protective Pipe Coatings), the Interstate Natural Gas Association of America (INGAA), and the American Gas Association (AGA).

i) EARTHQUAKE FAULT CROSSINGS

PG&E's Fault Crossings Program addresses the specific threat of land movement at active earthquake faults that subject a natural gas transmission pipeline to external loads due to seismic events. The program is consistent with California law that requires natural gas operators to prepare for and minimize damage to pipelines from earthquakes. PG&E performs system-wide studies to identify both the anticipated geologic movement and pipeline mechanical properties in order to prioritize mitigations that will enhance the integrity of the pipe (Table 22) during a seismic event. The mitigation work is then prioritized, following each study, by considering the likelihood of failure (the probability that the fault will trigger a seismic event), and the consequences of failure (including the impact on the local population, PG&E system reliability, and the environment). Mitigation typically includes modified trench designs, trench adjustment, pipe replacement or realignment, or installation of automated isolation valves.

Table 22 – Earthquake Fault Crossing Program		
	Studies[g]	Crossings Mitigated[h]
Pre-2015	52	24
2015	65	18[a]
2016	65	6[b]
2017	22	7[c]
2018	34[i]	25[d]
2019	12	12[e]
2020	38[f]	4
2021	8[j]	2
2022	61[k]	0[l]

(a) 2015 – 14 crossings were Fit-for-Service (FFS) per current design. 4 crossings replaced.

(b) 2016 – 3 crossings were FFS per current design. 3 crossings replaced.

(c) 2017 – 5 crossings were FFS per current design. 2 crossings replaced

(d) 2018-20 crossings were FFS per current design and 2 were considered mitigated by existing Valve Automation. 3 crossings were replaced.

(e) 2019 – 6 crossings were FFS per current design and 6 crossings were replaced.

(f) 2020 – 17 crossings were FFS per current design and 4 crossings were replaced.

(g) Studies are conducted to determine if pipe is FFS with geological, pipe assessments.

(h) Crossing is mitigated if pipe meets or is designed, retrofitted, or replaced to satisfy the FFS criteria.

(i) The difference between this report and PG&E's Transmission Pipeline Compliance Report 2019-01 submitted on January 30, 2019 is timing of data confirmation.

(j) 2021 – Studies of 38 crossings were initiated. 8 were completed.

(k) 2022 – 2021 studies identified new crossings based on new geological assessments. Completed studies of 61 crossings.

(l) 2022 – 6 crossings deferred to 2023.

Figure 38 – L-301A Fault Crossing Pipe Replacement

j) Leak Survey

Pipeline safety regulations require PG&E to conduct routine leak surveys on its gas system to find gas leaks. The frequency of the leak surveys depends on the type of facility, operating pressure, and class location of pipe.

PG&E outlines current requirements, standards, and guidelines for the Leak Survey and Detection Program in its procedures. In 2022, PG&E surveyed over 1.3 million gas distribution pipeline services, over 13,000 gas transmission pipeline miles, and performed daily leak surveys on 97 wells in compliance with CalGEM's emergency gas storage regulations. In addition, PG&E completed CARB Leak Survey at the 13

Gas Transmission Compressor/Storage Well Facilities, consisting of 150,598 individual components. PG&E also performed Daily Leak Survey of the three Storage Well facilities (Pleasant Creek, Los Medanos and McDonald Island) as part of the COGR (CARB Oil and Gas Rule) was completed successfully for all 365 days of the calendar year.

PG&E conducts three-year leak surveys consistent with Best Practice 15 in the Leak Abatement Order Instituting Rulemaking (OIR) D.17-06-015. PG&E will continue its expanded use of the Advanced Mobile Leak Detection technology for its gas distribution compliance survey. The use of the Advanced Mobile Leak Detection technology and the acceleration of leak survey cycle will continue to support PG&E in its ability to: (1) find and fix more leaks, thereby eliminating more potential hazards to the public; and (2) reduce GHG emissions.

In addition, in 2022, PG&E continued the Super Emitter survey across the entire distribution service territory in response to the Leak Abatement OIR, Best Practice 21. PG&E defines a Super Emitter leak as one that emits more than 10 standard cubic feet per hour of methane. As a result, in 2022, PG&E completed the Super Emitter survey on 100 percent of its gas distribution services. The purpose of this survey is for Advanced Mobile Leak Detection to identify and measure the leak flow rates of Super Emitters as they are found during this survey. The data will then inform PG&E of the prevalence of these leaks and the emission reduction that can be gained by repairing them quickly.

To further enhance its leak survey process, in 2019, PG&E implemented technology to enable an end-to-end paperless transmission leak survey process and integrated with enterprise systems. Initiatives are in progress to continue to build and support a full end-to-end paperless process for distribution leak survey. In 2019, PG&E implemented an application that allowed Leak Survey to create and document all leaks electronically. This same application was updated from late 2020 through 2022 to perform all leak rechecks and gas samples paperless and updates the system of record the same day.

To maintain employee and public safety, PG&E used drones with Open Path Spectrometry (OPS) leak detection units to fly our submerged transmission pipelines. This will reduce some road closures and keep our survey team off navigable waterways with boats.

In 2022, PG&E expanded on previous process improvement initiatives and introduced new customer communications to mitigate the 9,206 Leak Survey Can't Get In (CGI) inspection backlog. PG&E expanded its online customer scheduling portal, introducing custom links sent to customers via text message that allowed them to schedule thousands of service appointments within a few minutes using only their smartphones. Customers also continued to receive and book appointments through custom portal links received via email to allow for quick and easy appointment scheduling through a computer. In addition, PG&E created a new Gas Meter Safety Inspections page emphasizing the importance of gas meter safety inspections on PGE.com and shared the new page via email and mailed newsletters to millions of customers

to encourage them to grant PG&E access to conduct Leak Survey work. With these continuous improvement efforts, despite continued unprecedented challenges caused by COVID-19, PG&E was able to decrease the backlog of Leak Survey CGIs from 9,206 to 1,963 by the end of 2022. PG&E reported the monthly status of the backlog and was granted extensions to the Resolution M-4845 waiver throughout 2022, enabling further efficiencies in geographical CGI bundling. Resolution M-4845 allowed PG&E to continue to adjust specified pipeline operations and maintenance survey activities due to COVID-19 public safety concerns. At the end of 2021, IPG&E was able to reinstate an improved service disconnection process that had been stood down for the first 22 months of the pandemic. Summaries of PG&E's 2022 Leak Survey cycles for its distribution and transmission pipeline systems are shown in Table 23 below:

Table 23 – Leak Survey Frequency

Facility Types[(a)]	Description	Survey Frequency
Distribution	Business districts and public assemblies	Annually
	Buried metallic facilities not under cathodic protection and not covered by an annual requirement	3 Years
	All copper facilities	3 Years
	Balance of underground distribution facilities	5 Years
Transmission	Department of Transportation (DOT) transmission all odorized transmission (including non-HCA pipe within a Class III and Class IV location)	Semi-Annually
Un-Odorized DOT Transmission and Un-Odorized DOT Gathering	Class I, Class II, and Class III	Semi-Annually
	Class IV	Quarterly
Gathering (odorized)	Class I, Class II, Class III, and Class IV	Annually
Transmission Stations	Class I, Class II, and Class III	Semi-Annually
Electric Substations	Any existing facilities within 150 feet of the structure	Annually (PG&E Best Practice)

(a) See Utility Procedure TD-4125P-10, "Identifying Gas Transmission Assets."

k) Leak Repair

Pipeline safety regulations and California state code require PG&E to repair certain leaks. In 2022, PG&E's trained and operator-personnel graded leaks based on the severity and location of the leak, the risk the leak presents to persons or property, and the likelihood that the leak will become more serious within a specified amount of time. PG&E's leak grading practices for Grade 3 leaks exceed industry guidance, as set forth in GO 112-F. In addition to rechecking annually as required, PG&E repairs above-ground Grade 3 leaks on its distribution system within 36 months of discovery. In 2022, PG&E repaired 2,028 below-ground Grade 3 distribution leaks to further reduce GHG emissions.

In 2022, PG&E used its continuous improvement approach to more efficiently bundle and schedule leak repairs. Identifying all the work required in an area at one time provides opportunity to bundle work locations and effectively maximize the utilization of resources. In 2022, PG&E repaired over 17,500 gradable leaks on the gas distribution and transmission system.

Figure 39 – PG&E's Maintenance & Construction Crew at Work

In 2022, PG&E also focused on improving Leak Repair effectiveness and efficiency by maintaining a level-loading approach, managing the average days open for gradable leaks rather than the inventory of Grade 2 leaks at the end of the year. PG&E set an internal target for average age of open Grade 2 leaks of <150 days and exceeded that goal with the average days open of 112 days for 2022. In addition, in 2022 PG&E focused its leak repair efforts on increasing the capitalization rate to improve PG&E's system reliability and improve customer relations by reducing overall impact with multiple visits. PG&E's capitalization rate increased from 19 percent to 23 percent in 2022.

PG&E continues to review and improve its standards, procedures, field processes and equipment to further reduce the public safety risk of, and the emissions from, gas leaks.

I) Overpressure Elimination Initiative

A pipeline that operates at a higher pressure than the MAOP presents an operational risk to the safety of the public, employees, and contractors working on the facilities. When a pipeline operates above its MAOP, it is known as an abnormal operating condition and is described as an OP event. OP events have the potential to overstress pipelines and may lead to loss of containment. Large OP events (see Figure 40) pose significant safety and operational impacts to PG&E's gas system. A large OP event is defined as any verified pressure reading that exceeds the design limits set forth in the Code of Federal Regulations (CFR) – 49 CFR 192.201. PG&E has identified human performance and equipment failure as the two most common causes for OP events. Actions to eliminate OP events were implemented including: station design and construction best practices; lock-out/tag-out process improvements; and distribution of information around associated OP risk factors through training and communication initiatives. PG&E installed SCADA points to increase system real-time visibility in the Gas Control Center (GCC),

Figure 40 – Large Overpressure Events (2011 – 2022)

and Large Volume Customer primary regulation sets also received accelerated inspections.

In 2018, PG&E started to install secondary overpressure protection devices on pilot-operated regulation equipment.[21] PG&E originally had a strategic goal of eliminating the common failure mode at 50 percent of our pilot-operated sites by the end of 2022, including both distribution and transmission stations. This objective will be met predominantly by the installation of secondary OP protection devices (slam shut devices). Pilot-operated regulation equipment is particularly vulnerable to large OP events for two reasons: (1) the equipment can fail due to gas quality issues, such as debris, sulfur, liquids, or black powder; and (2) the equipment tends to have a design that causes both the regulator and the monitor to fail in an open position (common failure mode), therefore resulting in a loss of regulation.

As the program has evolved over the past few years, it has become apparent that installing slam shut devices on transmission stations that serve large number of customers potentially creates a large outage risk. Thus, PG&E has adopted a strategy to evaluate each of the stations individually before determining whether a slam shut device is appropriate. Conversely, the 2020 PIPES Act now requires that the common failure mode on distribution district regulation be mitigated, so PG&E has prioritized retrofitting these stations. PG&E currently has 1,535 distribution pilot-operated regulation stations and 572 transmission pilot-operated stations. At the end of 2022, PG&E had a total of 858 distribution and 67 transmission (925 total) pilot-operated stations in which the common failure mode has been mitigated, which equates to 55.9 percent and 11.7 percent retrofit percentages respectively (43.9 percent of the total population).

Figure 41 – Photo Pointing to Slam Shut Installations

At the end of 2018, the NTSB published a Safety Recommendation Report in response to a September 2018 overpressure event in Merrimack Valley, Massachusetts, also known as the Merrimack event. The recommendations in the NTSB report focused on the specific causes of this event, including implementation of professional engineering review, record completeness, MOC process, and additional control procedures during operations. For PG&E's low-pressure systems, the approach to reduce the likelihood of a Merrimack-type event and other reasonable possible drivers of an OP event is to augment code-required pressure control and OP protection devices (first layer) with a slam-shut (second layer) that will provide protection against an OP event. In addition, PG&E has developed controls to mitigate the risk of damage to a sensing line resulting in an OP event. Work is on-going to explore additional controls and mitigations in this area. OP events can be caused by several different drivers, which can include design-

related issues similar to the Merrimack event, equipment-related causes, construction activities, third-party damage, and human performance issues during maintenance. PG&E's strategy is to protect our assets and operations against all possible modes of failure.

In 2019, the first annual version of the Long-Term Overpressure Elimination Roadmap was published. This comprehensive document describes in detail past, current, and proposed future activities related to OP elimination. The second iteration of the plan was published in July 2020; the third iteration was published in July 2021; and the fourth iteration was published in July 2022. The Roadmap is updated annually, with the next iteration scheduled to be published in July 2023.

In 2022, PG&E recorded nine large OP events, which is in the middle of the historical range of 5 to 11 large OP events per year since 2012. Key points of emphasis to continue during driving down this number going forward includes: (1) the continuation of our strategy of installing secondary overpressure protection devices on pilot-operated regulation equipment; (2) the continued emphasis on human performance development and training; and (3) continuing to add additional rigor around the clearance development and execution process.

PG&E continues to review operations and look for opportunities to perform work to further limit potential MAOP exceedances. Each activity builds on the goal to eliminate large OP events, thereby contributing to system safety.

m) Community Pipeline Safety Initiative

STRUCTURE MILES | >99% ADDRESSED		
YEAR	MILES	PERCENT COMPLETE
2013	5.00	1%
2014	110.00	32%
2015	93.00	58%
2016	114.00	89%
2017	30.00	98%
2018	7.60	99%
2019	0.25	99%
2020	0.00	99%
2021	0.02	99%
2022	0.0749	99%
REMAINING	0.0191	< 1%
TOTAL	360.00	100%

VEGETATION MILES | >99% ADDRESSED		
YEAR	MILES	PERCENT COMPLETE
2013	115.00	7%
2014	146.00	17%
2015	380.00	41%
2016	540.00	76%
2017	258.00	93%
2018	86.60	98%
2019	18.03	99%
2020	0.26	99%
2021	0.91	99%
2022	1.02	99%
REMAINING	7.36	< 1%
TOTAL	1553.20	100%

Figure 42 – Structure and Vegetation Miles Addressed (2013 – 2022)

PG&E's Community Pipeline Safety Initiative (CPSI) is a shareholder-funded program that focuses on enhancing the safety of the gas transmission pipeline by addressing items located too close to the pipe that pose a safety and/or emergency access concern. When items such as structures and trees are located too

close to the pipeline, they can delay critical access for safety crews and potentially cause damage to the pipe.

Program-to-date, PG&E has addressed more than 99.9 percent of the identified safety concerns. This includes completing approximately 1,553 vegetation miles and 359.9 structure miles. There is still 7.36 miles of vegetation and 0.0191 miles of structures remaining. This work is primarily located in Lafayette, Palo Alto, San Jose District 6 and Santa Cruz County, with a few one-off projects in other locations. The cross-functional team is actively working with these jurisdictions and private property owners to complete all remaining work.

For areas with completed CPSI work, PG&E remains committed to keeping the area above and around the pipeline clear through our ongoing Gas Transmission Vegetation Management Program.

n) Gas Transmission Vegetation Management

PG&E's Gas Transmission Vegetation Management (GTVM) Program regularly inspects the area above and around the pipe to look for any new structures or trees/brush that are located within 14 feet of the pipeline and could pose a safety concern. We also review trees previously left in place as part of CPSI to determine if any conditions have changed.

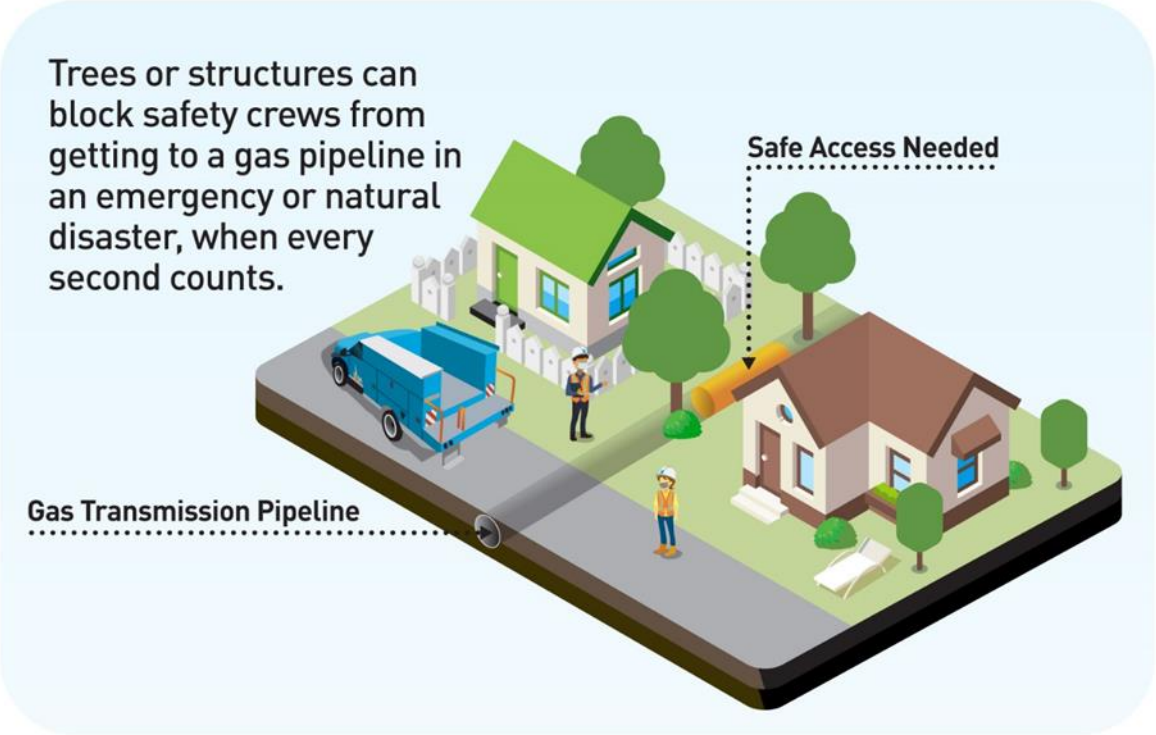


Figure 43 – Example of a Trees/Brush Inspection Site

The GTVM program inspects at least one-third (approximately 2,270 miles) of the gas transmission pipeline system each year. Any trees that are identified as too close to the pipeline are reviewed further to determine if they need to be removed for safety. Each year, PG&E reviews the trees identified as

potential safety concerns and prioritizes removals based on the risk posed to the pipeline and the community.

In 2022, crews inspected the area above 2,705 miles of gas transmission pipeline and addressed 88 miles of vegetation that posed a safety risk.

Before removing a tree, PG&E shares information with the property owner and provides an opportunity to the owner to remove or relocate the identified vegetation themselves. If an owner does not want to self-perform the work, PG&E will remove the vegetation at no cost to the owner. PG&E also works directly with property owners with structures identified as a safety concern to remove or relocate the structure at the property owner's expense.

We know we cannot do this work alone. In addition to the work mentioned above, PG&E also shares educational information on the importance of keeping the area above the pipeline safe and clear with local governments, first responders and customers. This outreach includes mailers, meetings/presentations, email communications, social media, a dedicated webpage, and more. In a customer research survey conducted in 2022, more than 80 percent of respondents found this collateral to be helpful in explaining the need to keep the pipeline clear and how to do so.

Through these outreach efforts, we are increasing awareness on safe planting practices near a pipeline and promoting shared responsibility among our customers to keep the area safe. This is leading to fewer new trees being planted in unsafe locations. By working together, PG&E and the community can reduce safety risks and prevent accidents and damage to the pipeline.

6. Mitigating the Risk of Loss of Supply

The risk of loss of gas supply poses significant public health and safety risks. Customers depend on their gas service for various energy needs including space heating, water heating, and cooking. In very cold weather, loss of space heating can itself be life-threatening in addition to prompting customers to use unsafe heating alternatives.[22] Loss of gas service can also lead to extinguished gas pilots and the subsequent potential for uncombusted gas entering affected buildings. In some scenarios, insufficient local pipeline capacity could result in loss of gas service to electric generation customers, which also introduces health and safety concerns. PG&E mitigates these risks by designing and operating its gas system to maintain adequate system capacity to supply forecasted demand.

In 2022, PG&E transported and delivered about 953.3 billion cubic feet of gas, a 4.7 percent decrease from the previous year.[23] To meet this demand, PG&E works year-round to assure system reliability through its management of system pressure, capacity, monitoring, and controls. The following sections discuss PG&E's programs designed to mitigate the risk of losing gas supply.

a) System Capacity Design Criteria

PG&E's gas systems are designed to meet all expected core demands (residential and small commercial customers) with noncore demand (such as large commercial or industrial customers) assumed fully curtailed at a design temperature that is the coldest temperature that may be exceeded once in every 90 years, on average (referred to as an Abnormal Peak Day, or APD). PG&E's gas systems are also designed to meet all expected core and noncore demand at the coldest temperature that may be exceeded once in every two years, on average (referred to as a Cold Winter Day, or CWD).

Table 24 – PG&E Gas System Capacity Design Criteria	
Design Temperature Average Recurrence Interval	**Design Condition**
One in 90 years, APD	Meet all expected core customer demand, with noncore demand assumed fully curtailed.
One in 2 years, CWD	Meet all expected core and noncore customer demand.

In addition to noncore curtailments, temporary manual operations can be implemented to increase available capacity on the gas system or shift flow to alleviate system constraints [see Section IV.2.c *Transmission Pipe* for Strategic Objective on meeting system capacity]. These operations are assumed to be in place when designing the system for capacity.

PG&E develops its capacity plans with the use of hydraulic simulation software to model its gas system. These models calculate expected pressures and flows throughout the system based on historical SmartMeter customer demand data trends. An annual model maintenance process ensures hydraulic models accurately reflect the physical and operational characteristics of the gas system. The process includes calibration and documentation components. Hydraulic models are accompanied by numerous analytical tools, processes, standards, internal and external data, and training and development to ensure personnel are properly equipped to implement the necessary measures for mitigating the risk of loss of gas supply.

b) Winter Operations

In addition to designing and building its gas system to meet forecasted customer demand, PG&E prepares a detailed operation and curtailment plan prior to each winter. These plans outline the planned response to forecasted cold weather conditions to ensure the system maintains reliable gas service and follows its capacity design standards. PG&E continuously monitors the pressure of its system and responds to any SCADA alarms that activate if system pressures fall to a level that is lower than what is expected [see Section IV.7.a *Gas System Operations and Control*]. Winter operating plans and long-term capacity plans are adjusted, as needed, based on actual system performance.

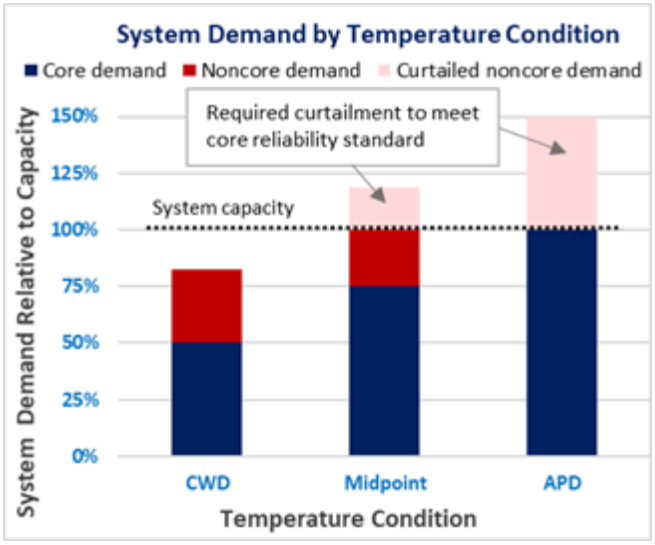


Figure 44 – Conceptual Representation of a Non-core Curtailment Plan

c) Operations for Facilitating Safety Work

In some cases, the measures necessary to mitigate risk requires temporarily changing the configuration of the gas system. For example, conducting a strength test requires taking a pipeline out of service. If pipeline anomalies are discovered through in-line inspection, the operating pressure of a system may need to be reduced until the anomalies can be further examined and repaired.

Safety work is scheduled such that adequate supply to customers is maintained, as practical. If adequate supply is unavailable, other techniques are utilized such as portable LNG, CNG, or compression. If necessary, planned service outages may need to occur but are coordinated with customers. Any operations necessary to maintain sufficient capacity in the system are documented in a clearance procedure [see Section IV.7.b *Operations Clearance Procedure*]. Clearance procedures also include SCADA alarm adjustments and pressure gauge monitoring requirements to ensure safe operation of the gas system.

Since 2021, guidelines for traditional in-line inspections have been in place that require the consideration of contingency plans to mitigate the risk of supply interruptions in the low probability event that an inspection tool becomes stuck in the line and restricts supply to the downstream system. If the risk cannot be fully mitigated, an emergency curtailment plan developed and undergoes leadership approval in advance of the inspection.

7. Mitigating the Risk of Inadequate Response and Recovery

In addition to the programs that PG&E has in place to mitigate the risk of loss of containment and the risk of loss of supply, PG&E is prepared to respond to and recover from incidents. PG&E's policies and procedures have been revised to provide effective system controls for both equipment and personnel to limit damage from accidents, explosions, fires and dangerous conditions. It is PG&E's policy to:

- Plan for natural and manmade emergencies such as fires, floods, storms, earthquakes, cyber disruptions, and terrorist incidents;
- Respond rapidly and effectively, consistent with the National Incident Management System principles, including the use of the Incident Command System, to protect the public and to restore essential utility service following such emergencies;
- Help alleviate emergency related hardships; and,
- Assist communities to return to normal activity.

All PG&E emergency planning and response activities are governed by the following priorities:

- Protect the health and welfare of the public, PG&E responders, and others;
- Protect the property of the public, PG&E, and others;
- Restore gas and electric service and power generation;
- Restore critical business functions and move towards business as usual; and,
- Inform customers, governmental agencies and representatives, the news media, and other constituencies.

Table 25 – Key Incident Response Objectives

Objective	Description
Establish Command	Determine the Incident Commander, set up an Incident Command Post (ICP), activate Emergency Center(s), if necessary
Assess Situation	Gather information about emergency, assess the situation in coordination with appropriate 911 agency(ies) and PG&E GCC
Make Safe	Make area safe for public, employees and others
Communicate/Notify	Communicate to/notify the appropriate PG&E personnel, regulatory agencies, public agencies such as fire, police, city and county emergency operations, GCC, customers and media
Restore	Restore gas service
Recover	Deactivate ICP and/or Emergency Centers and return to business as usual

PG&E uses the structure of the Incident Command System to complete key steps in responding to incidents. The key incident response objectives in Figure 44 represent a typical process flow through the cycle of an incident. However, incidents may not necessarily follow this exact sequence. For example, it may be appropriate to "Make Safe" at several points during the response process and not just after "Assess the Situation."

The next section discusses programs in place to mitigate threats to enable PG&E to respond in a timely manner.

a) Gas System Operations and Control

PG&E's GCC monitors and controls the flow of gas across PG&E's system 24 hours a day, 365 days per year, so that natural gas is received and delivered safely and reliably to customers. The GCC provides near instantaneous visibility on the gas system. This allows PG&E to prevent, quickly react to, and mitigate issues that may pose a safety risk to the public and PG&E employees.

Figure 45 - PG&E's Gas Control Center Features a 90 Foot-Long Video Wall with Current Operational Information to Augment The Gas SCADA System

PG&E's Gas Transmission Control Center, Gas Distribution Control Center, and Gas Dispatch functions are co-located in a single facility. The co-location of these three functions enables the company to better communicate, share information, and monitor the systems to provide superior emergency response coordination. This visibility, monitoring, control, and response capability is important to PG&E's

Transmission	3,414 Transmission SCADA points	100% Visibility into Transmission system Backbone	58% Visibility into Transmission local transmission	127 Transmission Devices installed 2011-2022
Distribution	5,987 Distribution SCADA points	79.8% Visibility into Distribution system		1,995 Distribution Devices installed 2011-2022

Figure 46 – PG&E's Progress in Enhancing System Visibility Through SCADA

Gas Safety Excellence vision. For the GCC to be effective, a key control need is situational awareness—the ability to identify, process, and comprehend the critical elements of information about what is happening. Billions of data records, composed of a mix of near real-time gas system operational data and a variety of geospatial, time dependent, and historical information that relates to the gas system provide critical information to Gas Control to aid in decision-making. This data interacts with alarms to focus the

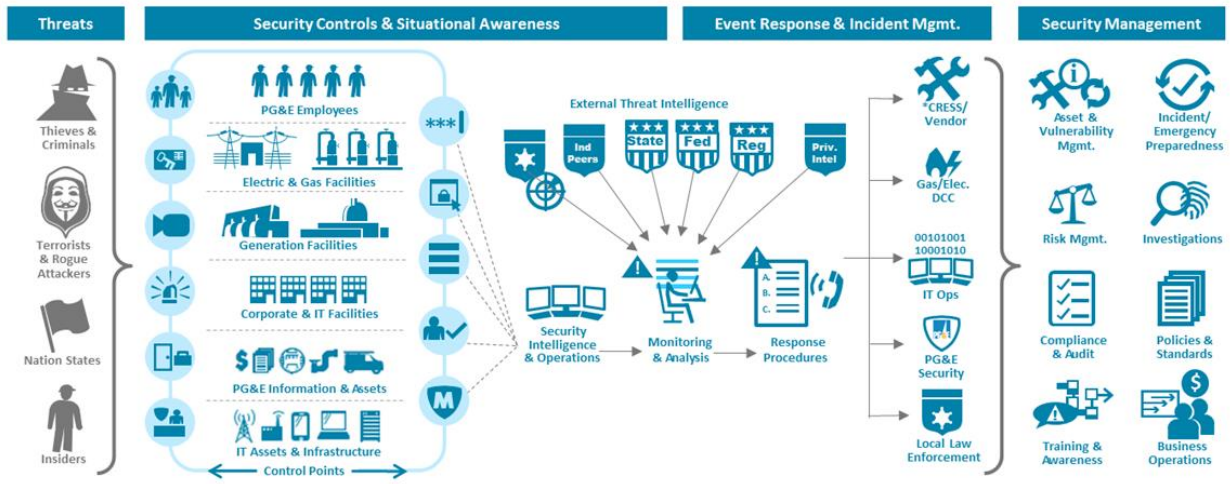
operators' attention on abnormal situations. They are also bundled to display clear information to operators so they can quickly assess a developing issue.

b) Operations Clearance Procedure

An important part of public and employee safety is the use of the Gas Clearance procedure. The Clearance procedure provides an added safety step or layer of protection to confirm that a plan and procedure to protect employee and public safety is in place before work is performed on the gas system. The Clearance Procedure is used for all work that impacts gas flows, pressures, remote monitoring and control, or gas quality. 2022 included efforts to collect key information on clearance supervisors and establish recommended rankings (CS1 or CS2) to understand the volume of training needed starting in 2023. New courses were also developed and released for endorsing and executing of distribution gas clearances in 2022; we also integrated experiential learning. The new Clearance Supervisor 2 (CS2) course will launch in Q1 of 2023. This course will also include experiential learning.

c) Security

PG&E's commitment to security directly contributes to our mission to deliver safe, reliable, affordable and clean energy. PG&E's Security Program, which includes both cyber and physical security, effectively manages security risks and proactively adapts to evolving threats and changing business needs. The Security Program, based on industry best practices, is designed to enable risk-informed decision-making necessary to support PG&E's mission.



NOTE: CRESS is Corporate Real Estate Strategy and Service

Figure 47 – PG&E Unified Cyber/Physical Security Program Effectively Manages Risk and Proactively Adapts to Evolving Threats and Changing Business Needs

PG&E's Enterprise Protection Fusion Center team tracks emerging and evolving activity which may pose a threat to the well-being of PG&E's employees, customers, and business enterprise. The Fusion

Center provides a centralized, converged approach to correlate and analyze information from varied internal and external sources, both physical and cyber, into a coordinated view and response. This approach aims to deliver a timely and accurate characterization of any incidents and thereby enable a coordinated response. Identified threats are then mitigated at the appropriate levels.

PG&E's Threat Intelligence team tracks evolving cybersecurity and physical security threats. Trends include a growing prevalence and sophistication of ransomware, destructive malware, and the growth of file-less malware on endpoints. Additionally, supply chain exploits continue to grow in sophistication and prevalence.

PG&E's Security Awareness and Training Program is an enterprise security strategy focused on maintaining and strengthening the security culture at PG&E. Regular security communications educate employees on how to keep the Company's people, assets and information secure. The PG&E Security Awareness and Training Program communicates and trains on security standards, best practices, tips, and risks, and helps employees understand the importance of protecting the people, information and assets at PG&E. The Security Awareness and Training Program establishes employee engagement themes based on security assessments and threat intelligence information and ultimately reduces security risk.

Protecting PG&E from the ever-changing cybersecurity and physical security threat landscape enables us to conduct our work in a secure manner that protects our customers, employees, and assets. PG&E Cybersecurity's mission is to deliver and maintain an integrated program to safeguard PG&E digital assets by:

- Identifying cybersecurity risks and defining mitigating strategies;
- Building, deploying, and operating effective security technologies and processes;
- Proactively monitoring for and responding to cyber-threats; and
- Collaborating with public and private entities to drive standards and best practices.

Figure 48 – Examples of Active PG&E Government Partners

PG&E's natural gas operations incorporate significant risk management activities, including those that address cyber and physical attack threats. PG&E's Cybersecurity organization advises Gas on cybersecurity risk mitigation activities to protect information and operational technology, with a focus on control systems. PG&E's gas control systems are considered critical digital assets, and therefore, require higher levels of protection through security controls and mitigation improvements. Security controls and

mitigation investments are reviewed and updated on an annual basis. PG&E has been working closely with U.S. Department of Homeland Security's (DHS) Transportation Security Administration (TSA) in response to the TSA's evolving Security Directives, initially issued in 2021, which require assessment and implementation of security measures.

PG&E's Corporate Security organization advises Gas on physical security risk mitigation and mitigation activities to physically protect functional area identified operational assets and cyber systems/assets from attacks through physical means. Corporate Security provides protection for all physical sites, while providing focused talent and processes for key critical infrastructure sites identified by the functional unit or DHS TSA Critical.

Given continual security threats and the evolving sophistication of adversary attacks, PG&E's Security Program is regularly assessed to validate strategic direction and improve alignment with current industry best practices. Assessments and improvements can occur through participation in security events, such as site-specific tabletop exercises, regular member participation with the American Gas Association (AGA), the Downstream Natural Gas Information Sharing and Analysis Center (DNG ISAC), and TSA calls and briefings and exercises. It is through the results of security exercises that PG&E is better able to identify and plan control improvements that strengthen Gas Safety. In 2022, the company worked with an external party that specializes in advanced security simulations and conducted a simulated physical and cybersecurity attack on the enterprise under closely supervised conditions. This simulation identified opportunities for improvement that have been prioritized for remediation as part of a continuous improvement strategy. Looking forward at the time of this writing, the GridEx exercises, which are held periodically, are planned for 2023 with GridEx VII.

d) Valve Automation

PG&E's Valve Automation Program is designed to accelerate emergency response and minimize the time of exposure in the event of an unintended release of gas. The Valve Automation Program allows certain gas transmission pipelines to be rapidly isolated through remote and automatic control valve technology. Installation of automated isolation capabilities on transmission pipelines in populated areas may reduce property damage and danger to emergency personnel and the public in the event of a pipeline rupture. PG&E's control room personnel have received training to develop a "bias for action." This training helps them recognize and act on system conditions warranting immediate isolation of pipeline systems. Planned SCADA installations are ongoing to increase system visibility [see Section IV.7.a. *Gas System Operations and Control*].

The Valve Automation Program builds upon the scope and principles in PG&E's Pipeline Safety Enhancement Plan that replaced, automated, and upgraded gas shut-off valves across PG&E's gas

transmission system starting in 2011 for a total of 399 through 2021. In 2022, an additional 4 valves were automated through the Valve Automation Program.

e) Emergency Preparedness and Response

PG&E's Gas Emergency Response practice is documented primarily in the Gas System Operations Control Room Management Manual and the Gas Emergency Response Plan (GERP).

i. Gas System Operations Control Room Management Manual

Gas Control is responsible for the overall operation of PG&E's gas system, and therefore closely monitors and coordinates emergency notifications, dispatching, system isolations, and restorations.

Gas Control personnel primarily use SCADA system data to monitor and control critical assets remotely. The SCADA system alerts Gas Control of gas system irregularities via alarms. When these alarms sound, Gas Control can immediately initiate and execute shutdown zone plans or direct field personnel to respond to critical locations for the execution of manual valve operations. In addition, Gas Control notifies appropriate 911 agencies and departments within PG&E so that emergency response resources are informed and dispatched.

To maintain compliance and aid in the management of abnormal and/or emergency operating conditions, PG&E regularly trains gas control personnel on the Gas System Operations Control Room Management Manual.

ii. Company Emergency Response Plan

The purpose of the Company Emergency Response Plan (CERP) is to assist the gas and electric businesses with a safe, efficient, and coordinated response to an emergency. For changes to PG&E's CERP, please see Attachment 2.

The CERP provides a broad outline of PG&E's organizational structure and describes the activities undertaken in response to emergency situations. The CERP presents a response structure with clear roles and responsibilities and identifies coordination efforts with outside organizations (government, media, other gas and electric utilities, essential community services, vendors, public agencies, first responders, and contractors).

The CERP follows a logical flow from general emergency response concepts and guidelines to specific emergency management organizational structure, roles, responsibilities, and processes. When appropriate, the plan also references supporting procedures and other response materials.

In addition, PG&E maintains business continuity plans, which describe how PG&E will continue its critical business processes in the event of a disruption to facilities, technology, or personnel.

iii. Gas Emergency Response Plan

The GERP[24] provides detailed information about PG&E's response to gas emergencies. It supports the response to all emergencies broadly as "One PG&E" through the integration with the CERP and the other functional area emergency response plans, which are annexes to the CERP. For 2022 changes to PG&E's GERP, please see Attachment 2.

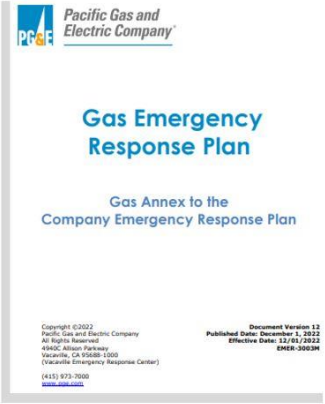


Figure 49 – The Gas Emergency Response Plan as of December 1, 2022

The GERP provides an outline of the Gas organizational structure and describes the activities undertaken in response to incidents. It provides a response structure with clear roles and responsibilities, a communication framework, and identifies coordination and response integration efforts with outside organizations and community first responder agencies.

The GERP outlines gas specific criteria to PG&E's Incident Levels that are provided in the CERP. The Incident Levels categorize and support PG&E in understanding the complexity of an incident and the actions that may be employed at each level (e.g., emergency center activations, resources requests, etc.). To ensure a consistent and well-coordinated response to emergencies, the Company has adopted the following incident classification system:

- Incident Level 1 – Routine;
- Incident Level 2 – Elevated;
- Incident Level 3 – Serious;
- Incident Level 4 – Severe; and
- Incident Level 5 – Catastrophic.

iv. Gas Emergency Preparedness Team

The Gas Emergency Preparedness Team assists Gas with emergency planning, preparedness, response, and review. This group maintains the GERP, leads exercises, facilitates after action reviews, and participates in industry activities designed to impart best practices. The group facilitates the use of the Incident Command System: a systematic, proactive approach for all levels of governmental and non-governmental organizations and the private sector to work together during an incident to reduce the loss of life, damage to property and harm to the environment. Further, the team supports the Gas organization's local emergency response structure and deployment, and the Gas Emergency Center, which is co-located with the Gas Control Center (GCC). These centers are activated according to criteria outlined in PG&E's GERP.

Throughout 2022, the Gas Emergency Preparedness Group:

Completed 100% of IMT (Incident Management Team) and GEC (Gas Emergency Team) team ICS (Incident Command System) 100/200 training

Facilitated 3 Well Control exercises and provided support for 26 Gas Operations Live Action Drills by establishing an incident command structure.

Supported the response to 7 emergency activations impacting Gas Operations.

Frequent outreach to first responders helps strengthen how PG&E coordinates when emergencies happen. In 2022, Public Safety Emergency Preparedness completed the following efforts in partnership and close coordination with first responders and local governments:

Figure 50 – First Responder Workshop

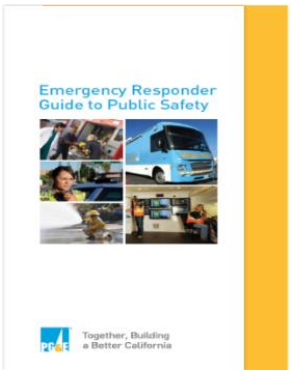


Figure 51 – Emergency Responder Guide to Public Safety

Figure 52 – Public Safety Liaison Meeting

Figure 53 – Emergency Management and Public Safety Teams Booth

Figure 54 – Emergency Center in Action

Figure 55 – Gas Emergency Preparedness at PG&E Live Action Drills

V. Workforce

PG&E's work requires well-trained personnel to correctly perform work activities. As a result, the Company invests in recruiting and retaining, provides ongoing development and training, and maintains supportive controls for employee and contractor work. Well-trained, fully-engaged employees are a key component of Gas Safety Excellence.

For example, employees are required to wear the appropriate Personal Protective Equipment (PPE) when they are in the field. Employees can refer to PG&E's PPE Matrix which documents the minimum PPE required when performing a certain task. PG&E annually reviews its PPE Matrix to evaluate the appropriateness of current PPE requirements. Employees in the field also document the controls for any identified hazards associated with their tasks using a Job Site Safety Analysis (JSSA) form. PG&E's PPE Matrix and JSSA are vital resources for employees as they plan their work prior to executing in the field.

1. Workforce Size

PG&E's internal employee workforce works in conjunction with qualified contractors to perform quality work and maintain the safety of PG&E's gas system. Gas engages the Workforce Planning function and Human Resources partners to determine the appropriate workforce size and types of roles that are required to fulfill our annual work objectives. We recruit qualified and talented employees and, at times, rely on the unique capabilities of various contracting firms during periods of peak or unique workload. PG&E has robust training programs and training facilities to develop its workforce so each of our employees

has the knowledge to perform his or her job safely and confidently. Safety training starts on day one as part of new employee orientation and continues throughout each employee's career.

2. Workforce Safety Projects

In 2022, PG&E continued to use projects designed to improve employee safety. The focus was on taking care of employees before an injury gets worse. The following summarizes the proactive measures taken by Gas in 2022 and their progress and successes:

RSI Guard – Gas activated the RSI Guard software on employee computers and enabled set break/microbreak frequency to promote breaks, stretches and microbreak awareness to perform computer work in a healthy and safe way. Gas performed at 95.6 percent overall break compliance in 2022, exceeding the goal of 85 percent compliance.

Nurse Care Line (NCL) – If an employee feels any pain or illness, they are encouraged to call the NCL for medical advice which can reduce the severity of an injury, if treated early. Nurse Care Line timely reporting has increased between 2013 and 2022. In 2022, there was a noticable increase in reporting of injuries within the first day by nearly 20 percent (as seen below):

Table 26 – Gas - NCL Timely Reporting

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Total	61.8%	64.3%	63.1%	69.5%	74.0%	77.7%	80.8%	75.5%	75.9%	95.6%

The focus on early reporting and prevention has contributed significantly to the downward trend of injury severity and reduction in average cost per claim. We anticipate this downward injury trend will continue with increased timely reporting, IAS utilization, Industrial Ergonomic evaluations, and Health and Wellness programs.

IAS Utilization – In 2022, 28 percent of GO eligible physical workforce participated in 1-1 services with an IAS. 97.3 percent of coworkers with a resolved IAS discomfort case did not have a new MSD-related worker's compensation claim within six months after case closure.

Industrial Ergonomics – Increased assessment of individual tasks by both Industrial Ergonomists and Field Safety Specialist through the utilization of Humantech and documented Ergonomic Observations. Ergonomic assessment leads to identification of risk and development of strategy for reducing discomfort and injury.

3. WORKFORCE TRAINING

PG&E's Gas Safety Academy in Winters, California, is a state-of-the art gas training facility that opened in August 2017. The facility includes a utility village, which provides realistic residential and commercial scenarios for leak survey, leak pinpointing, and emergency response. Other features include the Miller® LiveArc™ welding performance management system with a simulation/pre-weld setup mode and live-arc training mode allowing learners the opportunity to fine-tune their foundational welding skills, build confidence, become familiar with body mechanics, and build muscle memory prior to welding.

In 2022, the Gas Safety Academy added new residential meter set outlets pressurized with air allowing for additional student throughput. Using air versus natural gas fed meters allows for safe practice and eliminates methane emissions that may occur during purging. Additionally, four new elevated pressure meter sets were installed for Gas Service Mechanic training and included installation of over pressure protection relieve valves.

At the Gas Safety Academy, fundamental safety and code requirements are embedded within every course. Safety is non-negotiable and our standards align with the requirements of federal OSHA, Cal/OSHA, National Commission for Certification of Crane Operators, NACE, American Weld Society, and the California Department of Motor Vehicles.

Table 27 – PG&E Number of Courses Developed or Enhanced from 2012 through 2022

2022	47
2021	118
2020	224
2019	112
2018	122
2017	162
2016	214
2015	107
2014	78
2013	88
2012	14
Total	**1,286**
**total does not represent total # active courses*	

In 2022, Gas trained approximately 17,224 student days at the technical, apprentice, and leadership levels. As of December 31, 2022, PG&E had developed or enhanced approximately 1,286 courses since 2012 (Table 27). PG&E continues to enhance and continuously improve the training, so that all classifications in Gas have initial and refresher training.

Highlights from 2022 include:

- Implementation of the Running a Crew as a Crew Leader training program. This four-day course is an integrated Gas technical and leadership course designed to build on the leadership skills needed to be a safe and effective Crew Lead. Using scenario-based learning, emphasis is placed on effective leadership styles and demonstrating role model behavior. In addition to identifying and responding to abnormal operating conditions, students are taught effective communication, mentoring, and conflict resolution skills.
- The Winters training facility added 18 new residential meter set outlets pressurized with air, allowing for additional student throughput. Using air versus natural gas fed meters allows for safe practice and eliminates methane emissions that may occur during purging.

- The M&C flow lab valves received an update as an ongoing approach to upgrade equipment to ensure alignment with changes in the industry.
- Designed, established and implemented the Safe Access field to support the Compliance Department's Locate and Mark Training. Using an integrated holistic approach, this has enabled employees to safety locate electric facilities.

The Gas Safety Academy continues to improve technologies used to facilitate learning, including Mobile MyLearning, which was expanded to more courses. The expansion gives learners the ability to complete safety and compliance training on company smart devices without needing to travel to a headquarters. Mobile MyLearning provides the opportunity for on-demand training and immediate content updates in the field.

The goal of PG&E Academy is to continuously maintain our curriculum to ensure it mirrors current safety practices, procedures, regulatory requirements, and new equipment in the field. The recommendations in Table 28 are the output of a partnership between Gas SMEs, and PG&E Academy. The partnership starts with Gas Training Governance and is led by leaders within Gas to ensure that PG&E Academy's projects are aligned to key initiatives within the functional areas they support. High-risk, high-consequence tasks are identified by utilizing SME expertise to ensure that the training mirrors actual field conditions and scenarios. The Training Governance charter outlines the partnership with a mission to provide oversight, control, decision making, and coordination of its policies, procedures, and processes that successfully support PG&E Gas' strategic objectives to deliver to our hometowns, serve our planet, and lead with love.

Table 28 – Gas Training Recommendations 2012-2022

2012 Recommendation	Progress as of Dec 31, 2022
Develop programs that support employees throughout their career	• Courses developed and aligned to business need and results are measurable. • Completed and enhanced apprentice and new employee programs developed to advance employees to journey-level competency. • Increased focus on refresher training to maintain skill and competence of existing workforce.
Broaden technology solutions and leverage external curriculum	• Deployment of mobile web-based training solutions available on iPad and iPhone. • Performance support solutions available via portal platform and SharePoint for most functional areas in Gas Ops.
Implement continuous training improvement processes	• Gas Training Governance Committee continues to mature thorough an enhanced governance process to review and approve all major redesigned and new curriculum and training requirements. The Academy partnered with the Gas functional area and the Gas Qualifications department to develop technical training and qualification profiles for Gas employees to ensure consistency amongst job classifications and to provide line of sight into who is trained and qualified to perform the work. • Training materials archived and verified supporting records management initiative.

4. GAS OPERATOR QUALIFICATIONS

PG&E's Gas Qualifications Department maintains and implements qualification programs covering welding, plastic pipe joining, and operator qualifications pursuant to federal and state regulations and industry best-practices.

Figure 56 – Employees Taking Written Operator Qualification Exam

PG&E requires that all employees, contractors and third-party installers of pipelines be appropriately trained, and possess all requisite qualifications to perform tasks on pipeline facilities. A qualified operator has the expertise to complete work correctly and is part of the team that helps PG&E meet its commitment to public and employee safety.

Pipeline tasks require specific competencies to be performed safely and reliably. These competencies are reflected in the "Knowledge, Skills, and Abilities" (KSA) needed for each task; KSAs are determined by a group of SMEs specific to each topic. An individual's KSAs are assessed via a combination of written and performance (practical demonstration) evaluations and candidates must score 80 percent on written exams and 100 percent on performance exams to be "qualified." Evaluations are primarily geared towards safety and recognizing and addressing Abnormal Operating Conditions (AOC). Depending on the task and applicable regulations, qualifications must be renewed every six months, one year, three years, or five years.

Personnel use task specific Span-of-Control practices to gain hands-on experience working under the direction and observation of qualified individuals. Working under the direction and observation of qualified persons allows trainees to practice their skills in real-world conditions and gives qualified persons the opportunity to advise, to correct, and if required for safety, to take over the performance of the task.

By maintaining a qualified workforce, PG&E can quickly and competently recognize and respond to any AOCs that may pose a threat to the safety of the public, employees, or assets.

PG&E continued the program implemented in 2020 to ensure process consistency with an approved contract evaluator and proctors. The program includes regular visits by a PG&E Operator Qualification (OQ) representative to the approved contract evaluator's and/or proctors' location to conduct an observation of their OQ process during a live OQ evaluation. This is to ensure that the vast number of approved contract evaluators' programs are consistent with PG&E's internal OQ program and to provide feedback or opportunities for improvement when necessary. The Gas Qualification department continues to refine the process every year.

Recent improvements to the OQ program include an approved process for contractors to have an interpreter available for select exams to assist Spanish speaking participants to better understand the OQ

exam questions. Paper inspection documentation processes were converted to digital forms in 2022, eliminating the need for scanning and conversion to pdf post inspections.

PG&E's Gas Qualifications Department actively participates in benchmarking and process improvement initiatives with other utilities and other industries across the country to continuously find ways to increase the expertise of the workforce.

5. Contractor Safety and Oversight

Contractors are an important aspect of PG&E's technical workforce. Since contractors often work with PG&E assets and infrastructure that directly impact employee and public safety, the Company holds contractors to the same standard of safety as PG&E employees. The CPUC's Safety Culture OII proceeding (I.15-08-019) included a report that evaluated PG&E's safety practices, including those in Gas. The report recommended that the Gas organization update the contractor safety procedure to clarify responsibilities and reflect current organizations and processes, including guidelines regarding frequency of field observations. The Contractor Oversight Procedures follow a four-step process (Figure 57) for contractor safety and oversight. Other revisions included updates to various responsibilities (Competent Site Representatives and Project Team), enhanced the contractor safety observation criteria, and added requirements for a PG&E Safety Representative.

Figure 57 – Four-Step Process to Contractor Safety and Oversight

Prior to starting a job, PG&E pre-qualifies contractors and subcontractors and confirms they are qualified to complete contracted work through internal and third-party (ISN) reviews. PG&E continues to improve its contractor pre-qualification process and update it to meet and exceed corporate requirements. PG&E evaluates the contractor's qualifications and performance results, including a host of personnel injury performance metrics. As part of this qualification, contractors on major capital and expense projects such as strength testing, pipe replacement, valve automation, and ILI, are also given in-person and computer-based training on PG&E's quality and safety expectations and typical hazards associated with the work.

Once construction on a project has started, PG&E carries out a plan for contractor performance and clearly communicates contract terms that hold contractors accountable for safety and quality. Job-site observations start during pre-job walk-throughs to evaluate site specific hazards prior to starting work.

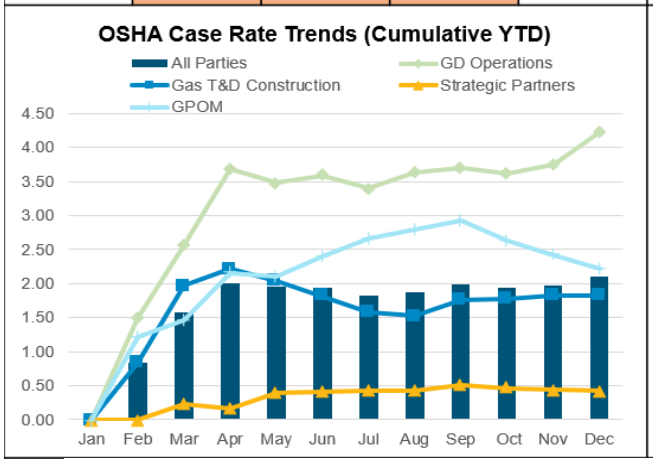
PG&E then schedules regular meetings with contractors to oversee their work and confirm expectations are met. In addition to regular oversight, PG&E inspects contractor work and a QA team

randomly checks project completion from beginning to end. On a quarterly basis, PG&E's leadership and contractor leadership meet to understand opportunities to improve the overall Contractor Safety and Oversight Program, analyzing both quantitative and qualitative trends in data from on-site observations and inspections.

After the job is complete, PG&E evaluates the contractor's performance using a scorecard that includes metrics on safety performance and contractual obligations. Contractors also have the opportunity to provide feedback to PG&E through a similar scorecard.

Contractor performance is tracked throughout the year and compared to Company performance. Figures 58 – 60 provide 2022 metrics on injuries and motor vehicle incidents comparing PG&E internal data and data provided by Strategic Partners.

Safety Trend Rates									
OSHA					LWD				
All Parties	T&D Operations	T&D Construction	GPOM	Strategic Partners	All Parties	T&D Operations	T&D Construction	GPOM	Strategic Partners
2022 End of Year					2022 End of Year				
2.11	4.22	1.83	2.23	0.42	0.46	1.06	0.24	0.86	N/A
Gas Operations EOY OSHA Target: N/A					Gas Operations EOY LWD Target: N/A				
2021 End of Year					2021 End of Year				
2.69	4.78	1.81	1.39	1.12	0.46	0.95	0.21	0.46	N/A
Quartile Ranking YTD					Quartile Ranking YTD				
N/A	4th	4th	4th	N/A	N/A	4th	2nd	4th	N/A



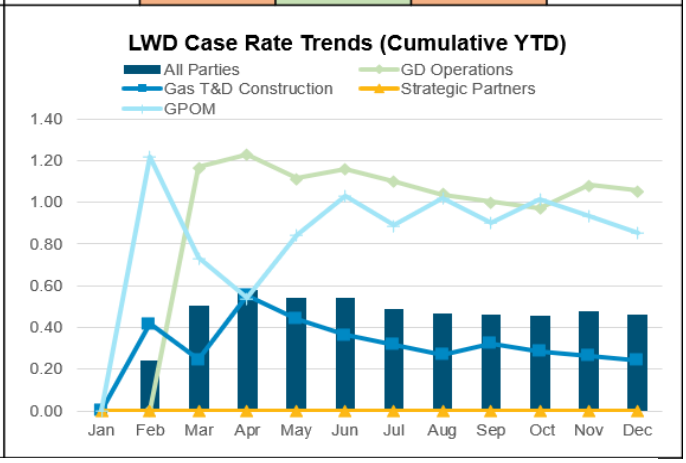


Figure 58 – 2022 Gas Safety Performance | OSHA and Lost Work Days (PG&E vs Strategic Partners)

Safety Trend Rates									
PMVI					SPMVI				
All Parties	T&D Operations	T&D Construction	GPOM	Strategic Partners	All Parties	T&D Operations	T&D Construction	GPOM	Strategic Partners
2022 End of Year					2022 End of Year				
1.51	2.59	1.93	1.39	0.69	0.15	0.30	0.25	0.15	0.00
Gas Operations EOY PMVI Target: N/A					Gas Operations EOY SPMVI Target: N/A				
2021 End of Year					2021 End of Year				
1.70	2.93	2.14	1.02	0.38	0.16	0.24	0.29	0.20	0.00
Quartile Ranking YTD					Quartile Ranking YTD				
N/A	1st	1st	1st	N/A	N/A	N/A	N/A	N/A	N/A

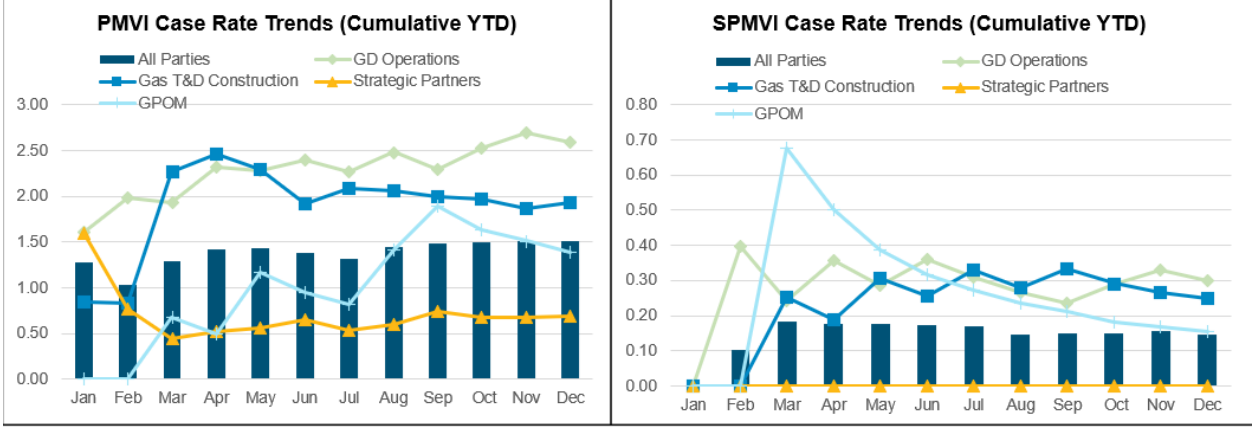


Figure 59 – Preventable Motor Vehicle Incidents and Serious Preventable Motor Vehicle Incidents (PG&E vs Strategic Partners)

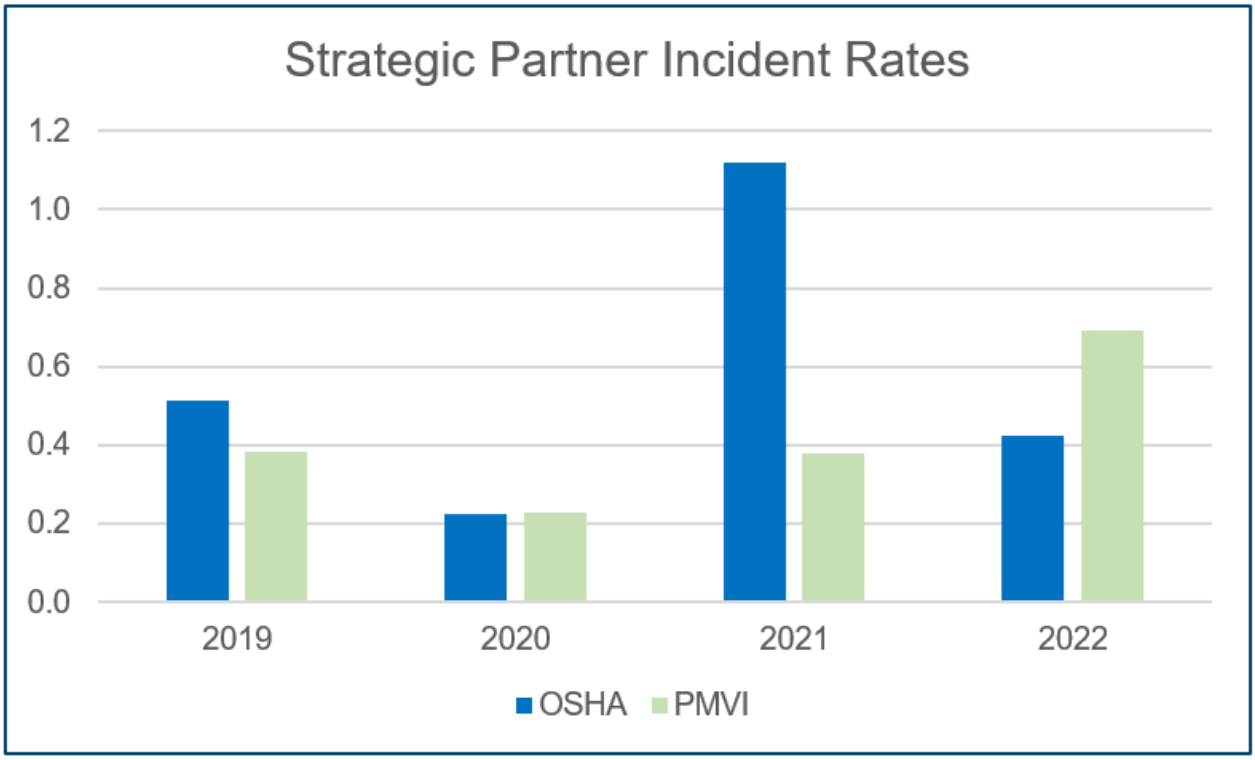


Figure 60 – Strategic Partner Incident Rates (2019 – 2022)

In 2022, the Gas Contractor Safety Team and the Gas Contract Owners focused heavily on improving contractor incident reporting, tracking, and follow up. There was also a notable expansion of Strategic Partners and the number of contract companies that reported their data in comparison to previous years. The incident reporting improvements in the Contractor Incident Program showed a substantial increase in reporting of First Aids, OSHA, PMVI, Good Catches, Dig-In and Property Damage. As a result of the improvements in the Contractor Incident Program, there were count and rate increases in comparison to previous years. Looking into 2023, Gas Contractor Safety expects to continue to see rigorous and expanded reporting by our Contract partners. Also starting in 2023, our Contract partners will lead their own SIF investigations with support from functional areas and the Enterprise EH&S Cause Evaluation Teams. Gas implemented an improved Project Specific Safety Plan and Programmatic Safety Plan for Medium and High Risk Gas Contractors. This expanded contractor engagement resulted in increased hazard identification and rigorous pre-job planning.

PG&E believes that employees who are engaged at work and who feel recognized are far more likely to work safer, be more productive, make better decisions and produce higher quality work.

As PG&E strives to improve project safety, quality and productivity, the Company takes every opportunity to acknowledge when people are doing things right and recognize them for their specific efforts, innovations, contributions, hard work, safe work practices, good decisions, great planning, timely completion or any other specific accomplishment—no matter how small. In 2022 there were 1,308 "Good Catches" turned in to PG&E's safety and construction management function. This is a 32 percent increase compared to 2021. Everybody that turned in a "Good Catch" was recognized and the "Good Catches" were shared on a weekly call with all PG&E construction and contractor leadership. Contractors continue to speak up to raise awareness and share best practices.

6. Partnership With Labor Unions

Union-represented employees make up almost 79 percent of PG&E's Gas workforce and are integral to the Company providing safe and reliable gas service. PG&E frequently works with its union partners to identify opportunities for training, process improvement, and other investments in the safety of its union-represented employees and the public. In 2022, PG&E continued to collaborate with union leadership leading to improvements, such as:

- The 100/100 initiative to support Distribution, Damage Prevention and Construction;
- Initiating Safety Culture Villages in 5 locations (union/management teams selected to improve safety culture);

- Re-launching PG&E “Keys to Life” campaign;
- Piloting gas coworker personal security safety devices; and
- Initiating Human Performance training throughout the organization.

VI. Compliance Framework

PG&E transports and stores natural gas under the requirements of state and federal safety regulations. The Ethics and Compliance Maturity Model was developed in 2016, and the model is derived from the Federal Sentencing Guidelines and the U.S. Department of Justice’s Evaluation of Corporate Compliance Programs, both of which define the parameters of an effective ethics and compliance program. In 2017, PG&E’s Executive Guidance stated that each functional area is to achieve Level 3 maturity in each of the following eight Maturity Model elements:

1. Risk Assessment;
2. Program Governance and Resources;
3. Guidance Documents;
4. Compliance Controls;
5. Communications and Training;
6. Monitoring and Auditing;
7. Investigation and Response; and
8. Enforcement and Incentives.

The maturity level ratings between 1 and 5 are defined as:

1. Initial;
2. Defined and Built;
3. Implemented;
4. Managed; and
5. Optimized.

The Compliance Maturity Model is a framework to manage the overall compliance program, and it provides Gas a guideline on what an effective ethics and compliance program should look like. This approach aligns with the “Plan, Do, Check, Act” (PDCA) management method that PG&E employs throughout its operations as part of Gas Safety Excellence.

Gas has made significant progress since the initial baseline performance assessment was conducted at the onset of the Compliance Maturity Model. In response to a 2019 assessment conducted by a third-party, which resulted in gaps being identified in all eight elements of the program for Gas, the work has continued to execute the annual Compliance Maturity Model remediation plans to improve maturity scores in all elements. By the 2020 assessment conducted by a third-party, Gas advanced to the next maturity level for five of the eight elements and achieved level 3 maturity for three elements.

Gas, in partnership with Ethics & Compliance, conducted a self-assessment in 2021 to determine if maturity levels had been sustained or improved. The 2021 assessment results were finalized in early 2022 and found that six of the eight Compliance Maturity Model elements achieved level 3 maturity scores. Element 4 – Compliance Controls remained at level 1, which was expected as the Controls Program is expected to reach level 3 maturity in 2025. Element 5 – Communications and Training was assessed at level 2, which was downgraded from the 2020 third-party assessment score of level 3. The drop in maturity level resulted from the absence of a process to validate that proper trainings are in place for compliance requirements. Table 29 below provides the maturity level score progress in Gas for each of the eight elements since the inception of the Compliance Maturity Model.

Table 29 – Gas Compliance Maturity Model – Assessment Scores by Element

Element	2016 Baseline	2017 3rd Party	2018 3rd Party	2019 3rd Party	2020 3rd Party	2021 PG&E	2022 n/a
1. Risk Assessment	3	2	3	2	2	3	Assessment not performed
2. Program Governance	2	2	2	2	3	3	
3. Governance Documents	2	2	3	1	1	3	
4. Compliance Controls	1	1	1	1	1	1	
5. Communications & Training	2	3	Not Assessed	1	3	2	
6. Monitoring & Auditing	2	2	3	2	3	3	
7. Investigations & Response	2	3	3	1	2	3	
8. Enforcement & Incentives	1	1	3	1	2	3	

A 2022 remediation plan was developed to address gaps identified in the 2021 self-assessment. One of the major remediation efforts included the development of a requirement owner certification in MetricStream. The certification provides validation from requirement owners that they fully understand and embrace ownership of their compliance requirements. The previous requirement owner certification efforts were performed manually using email and excel spreadsheets; moving the certification to MetricStream allows for data to reside in the enterprise system of record and creates more organized data enabling improved reporting and analysis moving forward. The certification also includes a validation of compliance trainings by requirement owners, which addresses a gap identified in the 2021 self-assessment. Another remediation effort in 2022 included the development of a new process to identify compliance controls associated to non-compliance issues that result from the Self-Report process. The new process will help identify whether there are controls in place to mitigate and reduce non-compliance risks.

An assessment to determine maturity level scores was not completed in 2022; however, a 2023 remediation plan was developed to continue to enable Gas to sustain or advance to a level 3 maturity level in seven of the eight elements. The 2023 remediation plan includes the implementation of the new process developed in 2022 to link non-compliance issues, the roll-out of the requirement owner certification in MetricStream, the continuation of the documentation of controls for high-risk compliance requirements and commencement of testing controls for design effectiveness.

While the Compliance Maturity Model structures PG&E's strategic approach to compliance, day-to-day compliance performance continues to be built upon four key enablers:

- Employee expertise;
- Providing employees the right information at the right time;
- Making available the right resources at the right time; and
- Implementing supportive controls.

1. BUILDING EXPERTISE

PG&E employees require specialized skills to perform their jobs constructing, operating and maintaining the natural gas systems. As detailed in *Workforce Training* (Section V.3.) and *Gas Operator Qualifications* (Section V.4), the Company recognizes that its employees are a critical element in the compliant operation of the pipeline system every day; competent and capable employees perform work safely, effectively, and efficiently while using their knowledge and experience to identify and raise opportunities for continuous improvement.

2. The Right Information to Do the Work

A highly-skilled workforce is most effective when provided with timely, accurate information. Gas pipeline work is highly technical and, if not performed correctly, could result in serious safety concerns. To enable the consistent performance of work across our service territory, PG&E uses written guidance documents, such as standards, procedures and job aids. These documents are stored electronically in the Technical Information Library and are reviewed and updated routinely to reflect both regulatory requirements and best practices, as well as any lessons learned from Company or industry experiences. Additionally, these documents are available in real time to the field and contractors via a mobile application, making access easy while on site. Even so, it requires significant efforts to keep all personnel performing work in accordance with these documents and ensuring that they are made aware of any changes. Coworkers are provided with the requisite training and access to subject matter experts- to maintain compliance.

PG&E continued the monthly publication schedule to pace the changes experienced by people performing the work, allowing for more time to receive and digest each change to their work between the publication date and the effective date of any given change. Email communications are sent out that separate changes based on several categories, allowing employees to more efficiently determine relevant changes. Additionally, each document change is assessed for impact and, depending on the assessment, is rolled out in a layered approach using multiple communication channels as appropriate. There are many channels utilized, such as simple emails or discussions from worker leadership, tailboards, direct group meetings with the people doing the work, or PG&E Academy training.

In addition to technical guidance, employees need accurate and timely information about PG&E's pipeline assets. PG&E has two pipeline GIS mapping systems—one for transmission assets, and another for distribution assets. These systems contain geospatial information about the pipeline system including detailed information about asset history, materials, manufacturer, and location for the majority of assets. These systems help PG&E effectively conduct integrity management program work, locate mains and services, and plan for construction. PG&E works continuously to improve the quality of the information in both mapping systems. Given the volume of work performed on the pipeline systems every day, it is critical to have processes that update these mapping systems accurately and promptly. As prescribed in the Compliance Maturity Model, compliance goals need to be accompanied by effective controls and performance monitoring.

3. The Right Resources to Do the Job

Once the portfolio of work has been identified and approved, the PG&E Resource Management team determines the number of internal and external resources that will be needed to complete the portfolio of

work efficiently. PG&E maintains master agreements with multiple contractors and maintains a database of construction qualifications to effectively assign work to the appropriate and most effective resources. PG&E uses workplans comparing the anticipated level of effort of planned work coupled with emergent work forecasts and compares that to internal resource capacity to signal the need for additional overtime, additional contractor resources, etc.

4. SUPPORTIVE CONTROLS

A compliant company utilizes numerous processes and programs to perform at a high level; some are aimed at monitoring or improving internal processes with corresponding compliance requirements and others are aimed externally to help PG&E identify opportunities for continuous improvement or pending regulatory changes. Table 30 below details some of these processes and programs.

Table 30 – Compliance Processes and Programs

Quality Management (QM) – The QM group assesses and provides direct feedback on the work quality for PG&E's important safety programs, including locate and mark, regulator station maintenance, and as-built record development. [See Section VII.2 *Quality Management*].

Internal Audit (IA) – PG&E's IA team performs arm's length reviews for all the Company's functional areas, including Gas , and is responsible for assessing control adequacy.

Non-compliance Self-Reporting – PG&E is committed to self-reporting compliance issues and taking prompt mitigative and corrective action. Each issue that is self-reported receives a work group evaluation to enable employees to learn from the issues and prevent reoccurrence.

Participation in Safety and Enforcement Division (SED) Inspections – In advance of CPUC SED inspections, PG&E self-evaluates gas divisions, districts and programs, such as Operator Qualification, Emergency Management and IM, and shares findings with the SED. PG&E strives to resolve identified issues within the same inspection cycle and respond to any data requests within the duration of the inspection.

Cause Evaluation – Similar to the continuous improvement mechanism in PG&E's Process Safety management framework, cause evaluations are post-incident investigations that include an incident analysis and recommendations to prevent or mitigate future reoccurrence. Cause evaluations are conducted based on business determination of identified issues.

Evaluation of NTSB Reports – The NTSB investigates all serious pipeline incidents. PG&E SMEs routinely review NTSB reports to learn from pipeline incidents. As a result, PG&E may adopt new approaches to addressing threats, change work procedures or develop new training.

Evaluation of PHMSA Bulletins – PHMSA regularly issues safety advisories for pipeline operators. As new safety information comes to light at other gas companies in the US, PHMSA issues bulletins to help operators take preventative action.

Corrective Action Program – The Corrective Action Program is an enterprise-wide system, allowing anyone within PG&E to raise compliance concerns to have the appropriate subject matter experts perform a compliance evaluation and to take appropriate actions.

Gas continues its focus on analyzing historical compliance data from SED inspections and self-reports to identify improvement opportunities. Leveraging the process management framework and data analytics, the Regulatory Compliance team was able to organize our top compliance challenges by seven non-conformance drivers and partner with our Process Owners (PO) and Process Managers (PM) in developing specific action items to address these top challenges. As a result of making data-driven decisions, Gas has made significant improvements in our compliance performance, with an overall downward trend of non-compliances since 2019.

In 2022, the Regulatory Compliance team advanced our continuous improvement efforts by partnering with the QM and Internal Auditing teams. The three teams created a framework where Regulatory Compliance would identify compliance trends, use Internal Auditing to perform thorough investigations, and have QM validate the effectiveness of the implemented preventative and corrective actions. As a result, Gas created new quality assurance programs and is working with POs and PMs to implement additional controls in their processes to prevent non-conformances. This effort, in conjunction with the development of the Compliance Maturity Model mentioned in Section VI Compliance Framework, allows for continuous improvement to prevent non-compliance.

VII. CONTINUOUS IMPROVEMENT

Continuous Improvement is the mechanism through which PG&E continues to evolve from being reactive to proactive in the journey to Gas Safety Excellence. By continuously taking a critical eye to existing practices, and identifying the cause of challenges that arise, PG&E can move to correct problems before they result in compliance violations or in harm to PG&E employees or the public. While continuous improvement is embedded in PG&E programs, a few programs are highlighted below.

1. LEAN

In February 2021, PG&E began implementing our Enterprise Lean Operating System, with a focus on driving a culture of performance around the company's top-line metrics and key risk areas (e.g., Wildfire Management) and supporting our customers and employees closest to the work. The Enterprise Lean organization provides strategic direction for our Lean journey and empowers continuous improvement.

Lean thinking refers to approaches that focus on the elimination of waste in all forms and smooth, efficient flow of materials and information throughout the value chain to obtain faster customer response, higher quality, and lower cost.

Lean leverages four plays (standards) to drive transparency, control and predictability for every coworker across the system. The Enterprise Lean Organization has focused much of 2022 on strategy deployment and building Lean capabilities along with standard tools. Many teams within Electric and Gas were trained to use Lean Visual Management board, implement the Lean Operating Reviews, and leverage Lean Problem Solving methods for faster results.

a) ELECTRIC & GAS PERFORMANCE AND PROCESS IMPROVEMENT TEAM (E&G PPI)

E&G PPI (formerly the Lean Capability Center) partners closely with the Enterprise Lean organization and supports our functional area partners in Gas and Electric, along with Operations Support. E&G PPI helps these functional areas move their businesses forward through Lean maturity and waste elimination projects, allowing us to improve our processes continuously and tenaciously. Major sub-teams within the E&G PPI functional team include:

Electric and Gas Lean Implementation Sub-Team: Implements the four plays of Lean: Visual Management, Operating Reviews, Problem Solving, and Standard Work, within Gas and Electric. Play 1: Visual Management is about being able to see at-a-glance, how we are performing against the most important metrics across safety, customer, delivery, quality, and people. Play 2: Operating Reviews are brief, focused reviews to identify and address issues and barriers to getting the right work done and is meant to involve the people closest to the work in the decision-making. Operating Reviews are done daily, weekly, and monthly. Play 3: Problem Solving is about resolving issues and negative trends that impede performance as soon as they are flagged by the people closest to the work. Play 4: Standard Work is focused on standardizing effective work processes and best practices so we can continue to improve.

Electric and Gas Lean Implementation Team Accomplishments in 2022 include:

- Supported 74 Weekly/Monthly Operating Reviews within Electric and Gas;
- Produced 6 videos with over 2,300 views that highlighted the importance of Lean and how to participate in each Play; and
- Delivered Lean Training to Electric and Gas Leaders focused on creating 2023 Tactical Implementation Plans for how we will deliver for our customers and coworkers.

In 2023, the Electric and Gas Lean Implementation Sub-Team will be focused on implementing Model Yards in both Electric and Gas. These are service yards within each region of PG&E where we will instill the fundamental aspects of the Lean Playbook using a high touch approach to our frontline leaders and their teams. As we stand-up each model yard, we will train leaders on the first four plays of Lean and how they will lead Lean within their teams. We will also continue supporting the Enterprise Strategy for Lean deployment of Play 4 through solid communications and change management.

Electric and Gas Process Architecture Strategy and Implementation Sub-Team: Develops the standards and governance structures to implement and sustain a Process Architecture that encompasses core operational, functional, and enabling processes for both Gas and Electric. Process Architecture provides a framework for driving cross-functional collaboration and accountability for operational performance. Each process represented in the Gas and Electric Process Architecture is owned by a Process Management Team that is led by a Process Owner (PO) and provides leadership to the Process Manager (PM) and Subject Matter Experts (SMEs) from functional groups to (i) stand up process management, (ii) track process performance and standardization, and (iii) oversee process improvement activities.

Electric and Gas Process Architecture Accomplishments in 2022 include:

- Identified 32 Processes and PO for Electric Process Architecture;
- Developed Process Architecture strategy playbook and support structure; and
- Met commitment of kicking off 16 Electric processes in 2022.

In 2023, the Electric and Gas Process Architecture Strategy and Implementation Sub-Team objectives include:

- Complete all 32 Electric Process Architecture onboarding by end of year;
- Mature Process Architecture governance processes to reinforce content ownership, enforce content integrity, and closer integration of Lean Plays into the Process Management controls and structures; and
- Enhance the Process Architecture Annual Process Reviews with broader stakeholder and SME participation that will tie the assessment results with Lean Plays and Business Plan Deployment (BPD).

As we become more adept at the Lean way of working, the result will be a more empowered workforce; improved problem solving; better transparency of work, performance, and drivers of work across disciplines; a more organized and efficient cadence of meetings to support coworkers; and improved service for our customers and communities.

2. QUALITY MANAGEMENT

Gas Quality Management (QM) is comprised of Quality Assurance (QA) at the Gas level and Quality Control (QC) situated either at the Gas level or within the functional work groups. QC looks for defects in the work being performed and in the corresponding records. QA is a combination of Quality Verification assessments that validate the effectiveness of QC looking for nonconformances to procedures and QA audits that look to prevent defects by identifying process gaps and recommending corrective actions. Together, QA and QC along with Compliance under the Quality Management System (QMS) umbrella are working together to drive down non-compliance risks. The following illustration depicts the layers of defense working to mitigate non-compliance risk.

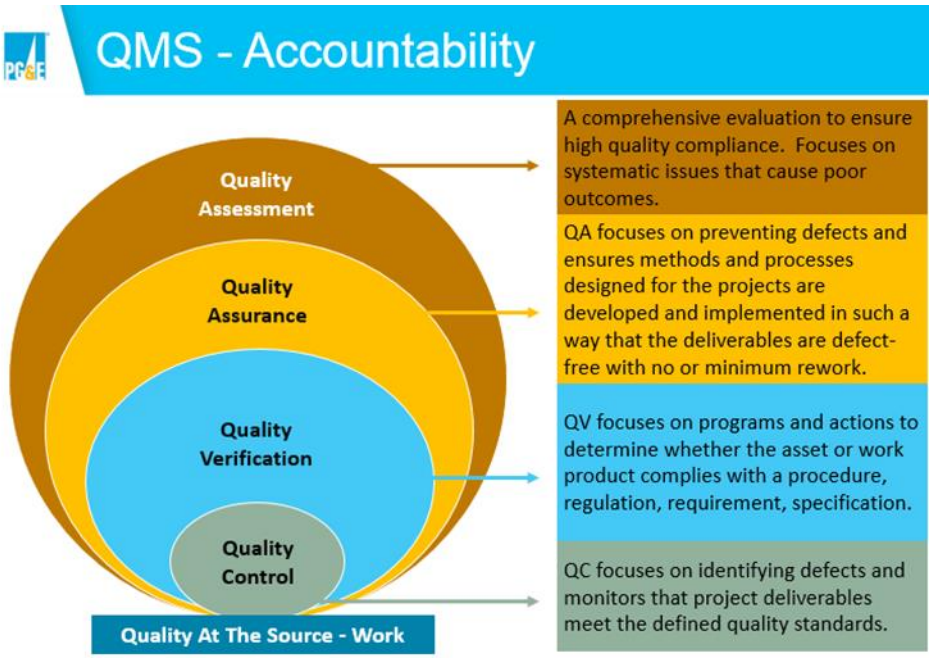


Figure 61 – Layers of Defense Against Non-compliance Risk

The QMS framework and collaborative approach to quality allows for continuous improvement and drives consistency by identifying nonconformances, recommending corrective actions and following up with mentoring and coaching people doing the work. It also continues to be in alignment with the fundamental principles of the QMS which leverages the "PDCA" framework (Figure 62 below). PDCA being the iterative four-step management method used in business for the control and continuous improvement of processes and products. Just as a circle has no end, the PDCA cycle should be repeated for continuous improvement.

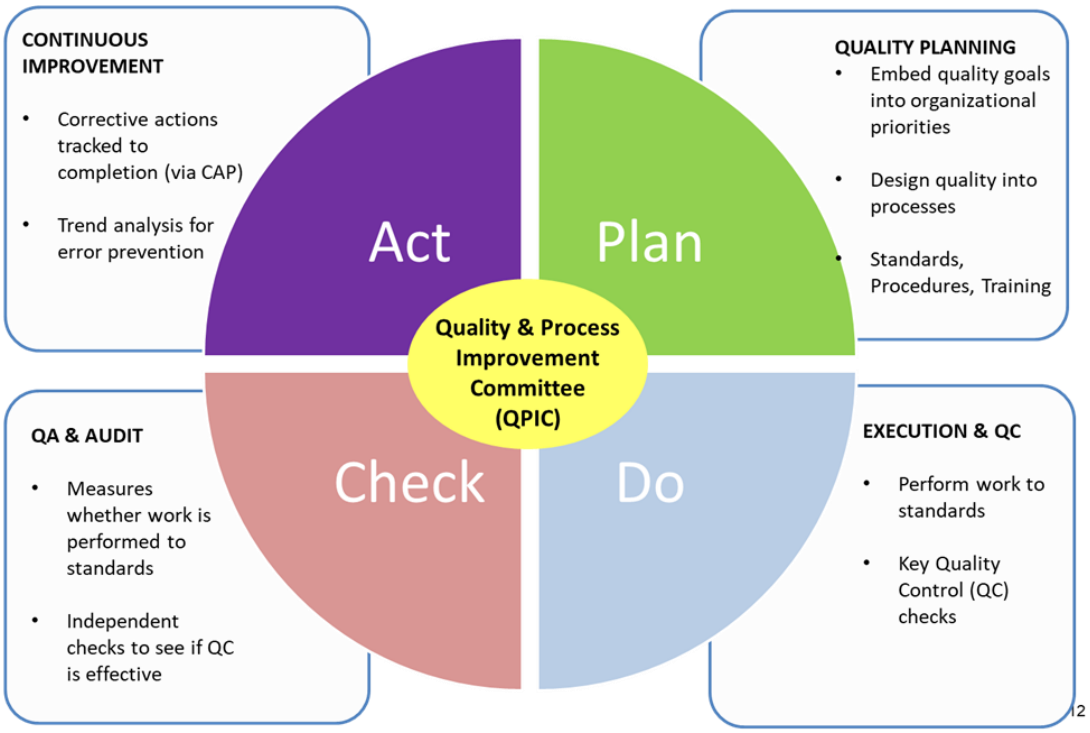


Figure 62 – QMS Fundamental Principles

In 2022, T&D construction, Regulator Stations and Valves, USA Tickets, Leak Survey records, and As-Built job packages continued to be reviewed by QC and QA. Gas shifted field-based QC to local leadership for Locate and Mark, Leak Survey and Corrosion. Field Services' field-based QC and QA assessments remained unchanged. There were 16 active QC/QA programs as of December 2022, shown in Table 31 below.

Table 31 – List of Quality Management Programs as of 2022	
Leak Survey T&D	Gas Pipeline Operations and Maintenance (GPOM) Odorization
Valves Maintenance	Distribution Construction
Field Services	Transmission Construction
Instrument Calibration	Regulator Station Maintenance
Corrosion – Exposed Pipe/Spans	Damage Prevention – Locate and Mark
Damage Prevention – USA Tickets	Gas T&D As-Builts
Distribution Maintenance	Corrosion – Rectifiers
Post Construction Asset Validation	Damage Prevention - Instrument Calibration

In keeping with our QMS maturity journey and expansion of our quality oversight we also accomplished the following in 2022:

- Conducted 6 targeted process audits;
- Performed over 110,000 QC records/as built job package assessments;
- Performed over 8,500 QA assessments (field and records combined);

- Launched new GPOM protocol;
- Created weekly and monthly dashboards for each functional area to share quality performance and trends related to quality assessments;
- Successfully started the No Conflict/No Conflict Screened USA Ticket program pilot;
- Completed additional oversight of demobilization construction jobs; and
- Participated in Controls Effectiveness training with Reg Compliance.

In 2022, quality performance across Gas continued to be measured in terms of a natural error rate where all nonconformances (regardless of high, medium or low risk ranking) were equal and the rate was calculated by dividing the number of nonconformances found by the number of items assessed. This approach continues to drive corrective actions for all nonconformances versus only those considered high risk. Over the past few years, high risk nonconformances have been vastly reduced, allowing us to expand our focus. PG&E continues to track high risk findings and track the corrective actions required to remedy a non-conformance.

3. SQA FOR DISTRIBUTION AND TRANSMISSION

The SQA organization is responsible for assuring the safety and quality of material provided by PG&E's suppliers. If non-conforming material is purchased to be used in pressurized gas systems it might introduce a safety risk to employees, the public, and to the gas infrastructure.

PG&E's SQA group collaborates with engineering, construction, and supply chain to enforce rigorous standards for incoming material and assures that qualified suppliers provide material that meets PG&E's product qualification requirements. SQA has significantly reduced Defective Parts Per Million (DPPM) since 2014. The 2022 DPPM performance was 152 against the target of 325. In 2021, SQA introduced a new metric (QPR = Quality Performance Rating), a proactive monitoring of suppliers' improvement of overall performance including, DPPM, responsiveness of suppliers' corrective actions, Quality Management System and other technically quality parameters which will aid PG&E in reducing risk with more targeted quality efforts. In 2022, we identified six suppliers utilizing the QPR assessment which needed improvement. We successfully supported the development of four of the six suppliers to bring them to PG&E's acceptable quality level.

SQA achieved significant performance since 2013 for quality programs driving supplied material to an ultimate goal of being defect free. 86 percent of gas high risk suppliers are ISO certified, and SQA was re-certified to ISO 9001:2015 QMS in 2022 and had zero non-conformities for all audits. Through PG&E's cross functional teams and supplier partners, SQA processed 185 supplier change requests in 2022 and one supplier material recall (85 percent improvement from 2021). In addition, SQA conducts an annual supplier survey to identify improvement opportunities.

Gas Operations Quality Assurance Target - FIELD			
2022 YTD Findings – Overall QA Targets			
High	Total Findings	Total Checked	Average Error Rate
37	692	75,816	0.912%
Gas Operations Quality Assurance Target - RECORDS			
2022 YTD Findings – Overall QA Targets			
High	Total Findings	Total Checked	Average Error Rate
0	618	99,249	0.623%

Figure 63 – 2022 QA Field/Records Performance Metric

4. Research and Development and Innovation

The Research and Development and Innovation (R&D and Innovation) Group brings innovative technologies and solutions from industry, government, and academia to PG&E's Gas .

R&D and Innovation is embedded within Gas through Gas Safety Excellence and the continuous improvement process. R&D and Innovation's work is prioritized based on the results of the Risk Management Process, so projects and innovations align with the most critical needs of the business [see Section IV.3. *Risk Management Process*]. R&D and Innovation projects and their results are directly included within each Asset Family Safety Plan to assure that new technologies and methods are effectively leveraged to improve the safety, reliability, and cost effectiveness of PGE's assets. Its scope includes not only Natural Gas, but also new fuels such as biomethane and hydrogen to support the decarbonization of the gas system towards carbon neutral energy delivery by 2045.

PG&E also uses the Center for Gas Safety and Innovation in Dublin, California. Opened in 2017, this facility consists of work and lab space with advanced tools, testing capabilities, and lab resources, with the goal of continuing to lead in the development of new methods and technologies to enhance gas safety. The work performed at this facility includes, among other things, working with other industry participants to find and test new products and processes, testing and evaluating M&C devices that contribute to the safety of PG&E's gas system, and conducting non-destructive examination on PG&E's pipelines to ensure asset integrity.

PG&E participates in collaborative efforts with national and international R&D organizations such as the Pipeline Research Council International (PRCI), the Northeast Gas Association's research group

(NYSEARCH), Operations Technology Development and Utilization Technology Development. PG&E also works closely with R&D programs at the California Energy Commission (CEC), Pipeline and Hazardous Materials Safety Administration (PHMSA), the California Air Resources Board (CARB), the federal Department of Energy and multiple universities including Stanford (through the Natural Gas Initiative), University of California, Berkeley, University of California, Davis, University of California, Irvine, etc. mobilizing and leveraging a broad spectrum of expertise to bring innovative solutions to Gas in the most effective way.

In 2022, the R&D and Innovation team managed and implemented a broad portfolio of nearly 200 active projects in collaboration with leading U.S. and overseas utilities, pipeline operators, and R&D organizations. Examples of 2022 achievements include:

- Completion of the PG&E Hydrogen to Infinity project FEL-1 (conceptual engineering design and financial feasibility) study. The project focuses on a large-scale and long-term field demonstration, with a new, stand-alone and custom-built high pressure gas transmission system in PG&E territory. The project will close knowledge gaps by providing California and the nation long-term operational data on the impacts of hydrogen blending in natural gas transmission pipeline system to safety, integrity, operations and maintenance, gas quality and measurement, and fluid hydraulics. (Figure 64)
- Installation of five additional Global Navigation Satellite System (GNSS) base stations throughout Northern/Central CA (for a total of 42 base stations) to expand and densify the Real-Time Kinematics (RTK) network coverage across PG&E's service territory to enable high-accuracy geospatial data collection for various workstreams such as Gas Distribution/Transmission General Construction and Locate and Mark. The distribution mobile as-built program has over 2,500 in-progress/completed projects that used the RTK network with an average GPS accuracy of 1.84 inches for over 290,000 newly installed assets. (Figure 65)
- The CCEC funded underground storage well integrity monitoring research using state-of-the-art distributed fiber optic sensing systems at McDonald Island Turner Cut Station. The research has already successfully demonstrated fiber optics' capability in real-time to capture various operational events in addition to potential external impacts on well tubing resulting from seismic events. Additional research in the lab has demonstrated fiber optics' sensitivity to gas leakage. This is the first comprehensive study on distributed fiber optic sensing monitoring for cost and safety enhancement in the natural gas underground storage well industry. (Figure 66)
- Gas R&D tested a French-based drone 3D mapping technology for locating a gas transmission pipeline at the Elkhorn Slough, a tidal wetland and a wildlife treasure located along the shoreline of Monterey Bay. Research into this use of the technology continues. The advancement of

drone-based mapping technology will support locating in environmentally sensitive and difficult to access areas. (Figure 67)

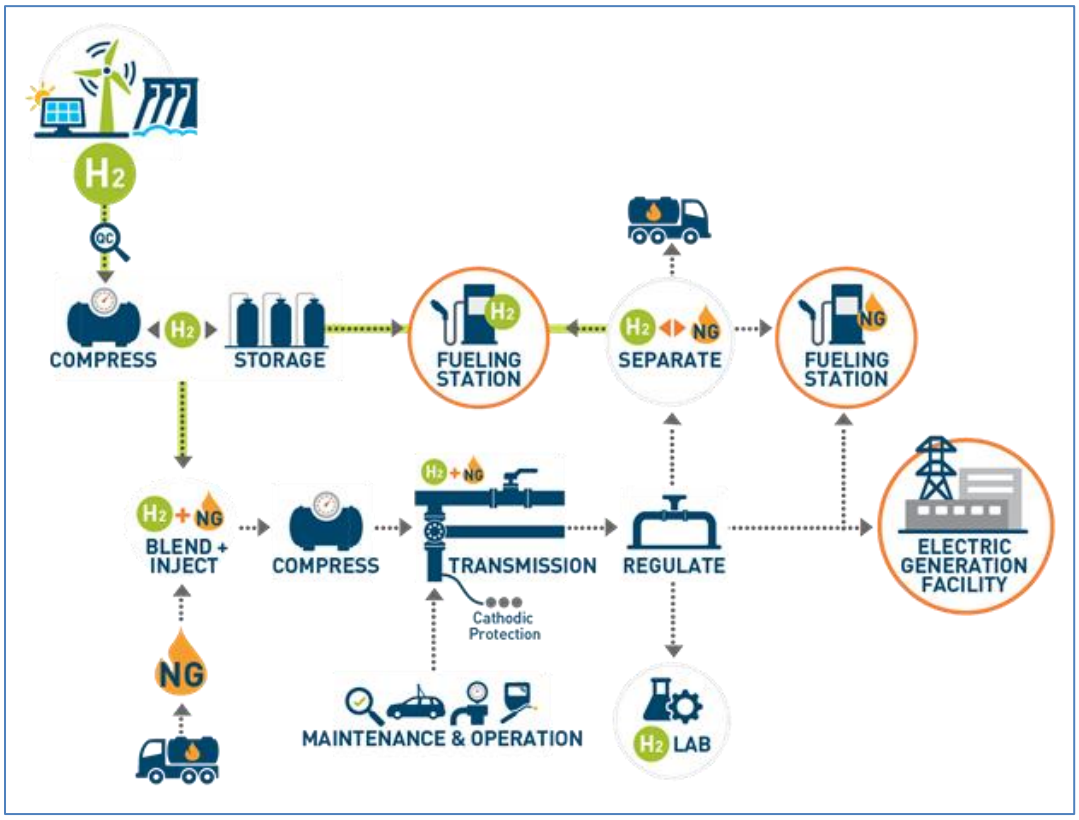


Figure 64 – Hydrogen to Infinity Project Overview

Figure 65 – Installation of GNSS Case Station in Placerville, CA showing the base station (left) and the external antenna (right)

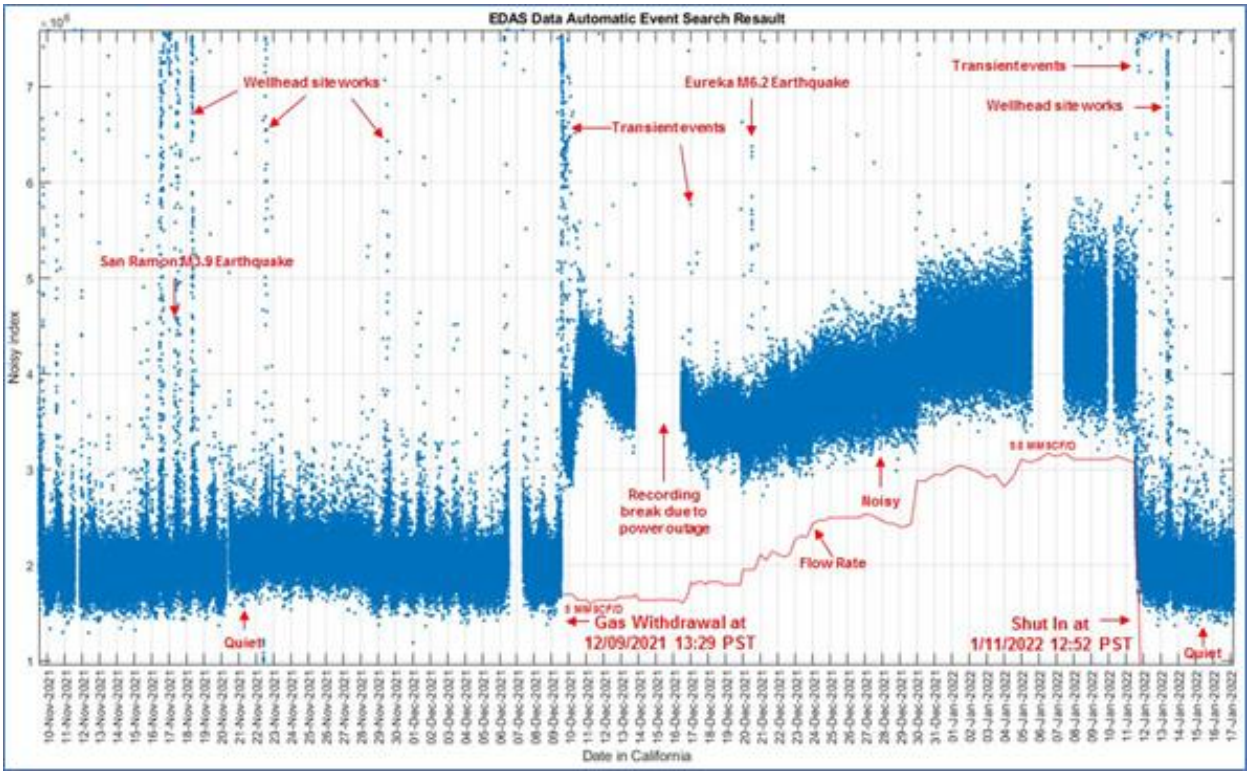


Figure 66 – The coherent noise index over 68 days including earthquakes and a gas withdrawal period captured in real-time by enhanced distributed fiber optic acoustic system in an operation well at McDonald Island Storage Facility

Figure 67 – Drone Based 3D Mapping Technology Testing at Elkhorn Slough

5. BENCHMARKING AND BEST PRACTICES

Benchmarking is an important step in PG&E's overall continuous improvement effort and is used to identify industry best practices. Best practices include, but are not limited to, widely recognized natural gas practices that directly enhance public and personnel safety over time. Benchmarking is one component of understanding what may constitute an industry best practice and is accomplished by both formal and informal means. There may also be more than one single industry "best practice" in any given program area. Therefore, PG&E's best practice identification often begins with identifying a published industry standard that provides guidance and sets overall direction for a program or technical discipline and discussing with other utilities. When standards are not readily identifiable, PG&E may employ various

methods, such as reaching out to industry associations, experts, and other utilities, to discuss best program approaches, and then develop detailed procedure manuals to document the practices. PG&E relies on various outlets for benchmarking best practices, such as reviewing standards written by SMEs and public agency publications and participating in industry associations. How PG&E utilizes each of these outlets is described in the next sections.

a) Industry Standards Written by Subject Matter Experts

One informal benchmarking practice that PG&E pursues is identification and use of standards written and reviewed by SMEs. Sometimes these standards are referred to as "consensus" standards, meaning that the publisher believes that they represent proven practices in that particular field. In addition to seeking best practice standards that originate in the United States, PG&E identifies international standards for best practices, including European and ISO. PG&E has adopted for use several European standards. In another example, PG&E pursued the certification of ISO 55001, the international asset management standard, and has both achieved and sustained certification.

PG&E relies on associations such as the AGA, ASME, INGAA, PSE&G and the API to facilitate the development of best practices, to prescribe codes and standards for the natural gas industry, to provide forums such as conferences and meetings for like members to learn about relevant best practices, to publish best practice literature, industry reports, and relevant industry statistics, and to provide technical continuing education. Some of PG&E's foundational risk management and gas program activities follow ASME standards and API consensus standards that are referenced in code, such as B31.8S, Managing System Integrity of Pipeline Systems and RP 1162, Public Awareness programs.

b) Agency Publications

PG&E reviews relevant agency documents to gain insight into what regulatory and investigation agencies view as best practices. PG&E incorporates input from previous proceedings and reviews, including the CPUC, the NTSB, PHMSA, and reviewers contracted by these entities.

As an example, PG&E has a procedure to ensure appropriate responses to PHMSA advisories and any proposed or final rulemaking notices from other regulatory agencies. The procedure expedites reviewing, assigning, and tracking of all Gas T&D related advisory bulletins and proposed or final rulemaking notices from any regulatory agency in a timely manner.

c) Peer Associations

Benchmarking is performed with a variety of utility and non-utility entities to improve PG&E's understanding of how other companies manage various operational programs, including best practices

related to safety. For instance, PG&E personnel learn about best practices from interacting with peers and industry experts in organizations.

PG&E employees participate in and present at a variety of industry conferences. These conferences are gatherings of industry representatives with similar backgrounds to discuss best practices, review emerging practices, share operating information, and build networks for future best practice sharing. Some of the peer-to-peer associations PG&E participates in are described below in more detail.

d) American Gas Association

As part of PG&E's continuous improvement commitment to safety in Gas, the Company is an active member of the AGA. The AGA helps PG&E share, validate, and learn about gas safety best practices through targeted Operating Committees and Discussion groups with peer organizations. For example, PG&E participates in the AGA Best Practices Program, AGA SOS Survey Program, AGA Leading Indicator Survey, and other safety and occupational hazard survey programs by both distributing and responding to surveys with topic-specific information requests and uses the data provided by other U.S. utility gas companies.

e) Interstate Natural Gas Association of America (INGAA)

The INGAA and the INGAA Foundation develop consensus guidelines and position papers based on the input of its members. PG&E considers these materials to constitute evidence of natural gas transmission pipeline companies' "best practices," and they are widely recognized in the industry as such. INGAA has a membership base that owns approximately 200,000 miles of natural gas pipeline in North America. PG&E relies on INGAA to facilitate the identification, development and sharing of best practice materials.

f) The Association for Materials Protection and Performance (AMPP)

PG&E relies on AMPP, formerly known as National Association of Corrosion Engineers (NACE), to identify and develop standards, test methods, and material recommendations that are widely regarded as the best in the field for corrosion—specifically for CP and coatings. AMPP creates these materials through the subject matter expertise of its members. AMPP has over 28,000 members in over 100 countries.

g) Western Energy Institute

The Western Energy Institute (WEI) is the premier Western association of energy companies that implements strategic, member-driven forums, identifies critical industry issues, and facilitates dynamic and timely employee development opportunities. WEI provides forums for exchanging timely information on critical industry issues and information about industry best practices and skills training. PG&E also participates on several committees.

h) Public Service Enterprise Group

The PSEG is a publicly traded diversified energy company headquartered in Newark, New Jersey and was established in 1985. The company's largest subsidiary is Public Service Electric and Gas Company (PSE&G).

The Gas and Electric Utility Peer Panel was established in 1993 and is a collaborative effort among member utility companies that focus on sharing benchmark data on an annual basis.

PSE&G developed the panel of companies for exchanging accurate and meaningful data on key performance metrics.

i) Additional Benchmarking Efforts

In addition to participating in numerous associations, PG&E also develops benchmarking, by using the expertise brought to the Company by new-hires and contractors with industry experience, by attending trade conferences, and by information sharing with other utilities.

PG&E also uses benchmarking to facilitate continuous improvement. When possible, PG&E benchmarks metrics to understand performance against peers.

Industry performance also informs target setting. The following chart lists a few key safety metrics that PG&E benchmarks against other utilities:

Table 32 – Key Benchmarking Metrics

PG&E's Commitment to Safety	Measurement
Emergency Odor Response	Average response time
Year-End Grade 2 Leak Backlog	Per 1,000 miles of mains and services
Year-End Grade 3 Leak Backlog	Per 1,000 miles of mains and services
Lost Work Day Case Rate [(a)]	LWD per 200,00 hours worked
Total Dig-in Reduction1	Total Number of dig-in incidents per 1,000 tickets
Third Party Dig-In Reduction	Number of third party dig-in incidents per 1,000 tickets

_____

(a) This measure is benchmarked at the Company level.
Comparative data associated with these benchmarks may be protected by confidentiality or non-disclosure agreements.

VIII. CONCLUSION

The 2023 Plan update demonstrates PG&E's commitment and progress in implementing processes, programs, and procedures to achieve the stand of keeping everything and everyone safe. The GSEMS guides how PG&E operates, conducts, and manages all parts of its business by putting the safety of the public, PG&E's customers, and PG&E's employees and contractors at the center of its work. PG&E maintains an asset management system to help address risks by knowing the assets and their condition, understanding the risks involving those assets, and developing and implementing risk reduction strategies with the intent to achieve risk reduction in balance with operational performance and cost. PG&E has made continued progress, but recognizes that there is more to be done in its journey to Gas Safety Excellence.

IX. ENDNOTES

1 See Attachment 01 for a Table of Concordance that provides a mapping between the Public Utilities Code Sections 961 and 963 and the Gas Safety Plan sections.

2 In October 2011, the California legislature signed into law SB 705, which declared "[i]t is the policy of the state that the commission and each gas corporation place safety of the public and gas corporation employees as the top priority." SB 705 was codified as Public Utilities Code §§ 961 and 963(b)(3).

3 Degree considerations can include: physical harm vs. immediate life threatening; redundancy vs. single point failure; recovery vs. point of no return; local vs. widespread, monetary impact.

4 An employee-led team that promotes safe work habits, shares information and best practices, promotes open and honest communications, and finds innovative methods to perform work safely.

5 This system was designed based on the elements of Process Safety developed by the Center for Chemical Process Safety, a branch of the American Institute of Chemical Engineers.

6 API RP 754 identifies leading and lagging indicators for nationwide public reporting, as well as indicators for use at individual facilities including methods for the development and use of performance indicators. This comprehensive leading and lagging indicators program provides useful information for driving improvement, and when acted upon contributes to reducing risks of major hazards (e.g., by identifying the underlying causes and taking action to prevent recurrence). The indicators are divided into four tiers that represent a leading and lagging continuum.

7 See Risk Management Process section for definitions of top risks.

8 See PG&E's 2021-02 Gas Transmission & Storage Safety Report (submitted on May 16, 2022) and PG&E's 2021 Gas Distribution Pipeline Safety Report (originally submitted on March 30, 2022).

9 American Petroleum Institute (API) Recommended Practices (RP) 1170, Design and Operation of Solution-mined Salt Caverns Used for Natural Gas Storage. API RP 1170 provides functional recommendations and covers facility geomechanical assessments, cavern well design and drilling, solution mining techniques & operations, including monitoring, and maintenance practices.

10 API Recommended Practices (RP) 1171, Functional Integrity of Natural Gas Storage in Depleted Hydrocarbon Reservoirs and Aquifer Reservoirs. API RP 1171 recommends that operators manage integrity through monitoring, maintenance and remediation practices and applies specific integrity assessments on a case-by-case basis.

11 The compressor at the Pleasant Creek storage facility has been isolated from the storage field; sale of the facility is pending.

12 The Transmission Pipe asset family includes valves and fittings outside of station boundaries and not otherwise included in the M&C asset family, which are those valves defined in TD-4551S – Station Critical Documentation. An example of valves included in the Transmission Pipe asset family includes manually operated mainline valves.

13 As set forth in 49 CFR Part 192, Subpart O.

14 Executive forums include the Executive Leadership Team meeting (the Chief Executive Officer (CEO) and her direct reports), the Senior Leadership Team meeting (the CEO, her direct reports and their direct reports) and the Run the Business meeting (all PG&E officers).

15 49 CFR §192.614.

16 California Government Code §4216.

17 The term cross-bore is broadly defined as an intersection of an existing underground utility or underground structure by a second utility resulting in direct contact between the transactions of the utilities. The cross bore can compromise the integrity of either utility or underground structure. Examples include gas, telecom, water, storm, and sewer among others.

18 Identified mileage does not include girth welds or branch connections. Additionally, it does not include the miles of pipe that would be necessary when pipe replacements are rolled into engineered projects.

19 This program does not address the threats posed when natural gas pipelines that cross active earthquake faults. Please refer to PG&E's Earthquake Fault Crossing Program in Section IV.5.i.

20 Tensile stress is when equal and opposite forces are applied on a body, in this case a pipeline.

21 An extensive benchmarking effort with European operators plus a review of European regulations led to the development of a strategy that supports the goal to eliminate OP events with the deployment of a secondary overpressure protection device under certain conditions.

22 215 deaths related to the February 2021 winter storm in Texas were caused by extreme cold exposure, exacerbation of pre-existing illness, carbon monoxide exposure, or fire.

23 PG&E's California Gas Transmission Pipe Ranger website Supply and Demand Archives, https://www.pge.com/pipeline/operations/cgt_supplydemand_search.page. Execute search for December 31, 2022 and preceding 366 days, then add values listed in "Total System Supply" row.

24 The GERP complies with CFR Title 49, Transportation, Part 192—Transportation of Natural and other Gas by Pipeline: Minimum Federal Safety Standards, Section (§) 192.615, "Emergency plans." and (§)192.605 "Procedural manual for operations, maintenance, and emergencies."

X. APPENDIX A – LIST OF FIGURES

XI. Appendix B – List of Tables

XII. APPENDIX C – LIST OF ATTACHMENTS

Attachment 01 – Table of Concordance

Attachment 02 – Change Logs for PG&E's Asset Management Plans, Company Emergency Response Plan, and Gas Emergency Response Plan

Attachment 03 – Change Log for 2023 Gas Safety Plan

PACIFIC GAS AND ELECTRIC COMPANY

ATTACHMENT 1

TABLE OF CONCORDANCE

2023 Gas Safety Plan Table of Concordance

PG&E provides this Table of Concordance to demonstrate the Gas Safety Plan compliance with the Public Utility Code (PUC) Sections 961 and 963 (b)(3):

PUC Section	Section Location(s) in Gas Safety Plan
961 (a): For purposes of this section, "gas corporation workforce" means the employees of a gas corporation and employees of an independent contractor of the gas corporation while working under contract with the gas corporation.	V. Workforce
961 (b) (1): Each gas corporation shall develop a plan for the safe and reliable operation of its commission-regulated gas pipeline facility that implements the policy of paragraph (3) of subdivision (b) of Section 963, subject to approval, modification, and adequate funding by the commission.	The 2023 Gas Safety Plan is submitted as required by this section.
961 (b) (2): By December 31, 2012, the commission shall review and accept, modify, or reject the plan for each gas corporation as part of a proceeding that includes a hearing. The commission shall build into any approved plan sufficient flexibility to redirect activities to respond to safety requirements.	Not applicable to PG&E.
961 (b) (3): Each gas corporation shall implement its approved plan.	The 2023 Gas Safety Plan provides a view into the safety activities PG&E pursues every day and highlights the specific safety work performed in 2022.
961 (b) (4): The commission shall require each gas corporation to periodically review and update the plan, and the commission shall review and accept, modify, or reject an updated plan at regular intervals thereafter. The commission, pursuant to Section 1701.1, shall determine whether a proceeding on a proposed update to a plan requires a hearing, consistent with subdivision (e).	PG&E reviews and updates its Gas Safety Plan on an annual basis. See I. Introduction.

PUC Section	Section Location(s) in Gas Safety Plan
961 (c): The plan developed, approved, and implemented pursuant to subdivision (b) shall be consistent with best practices in the gas industry and with federal pipeline safety statutes as set forth in Chapter 601 (commencing with Section 60101) of Subtitle VIII of Title 49 of the United States Code and the regulations adopted by the United States Department of Transportation pursuant to those statutes.	References to programs that comply with federal pipeline safety statutes and/or conform to industry best practices are referenced throughout the document as applicable.
961 (d): The plan developed, approved, and implemented pursuant to subdivision (b) shall set forth how the gas corporation will implement the policy established in paragraph (3) of subdivision (b) of Section 963 and achieve each of the following:	
961 (d) (1): Identify and minimize hazards and systemic risks in order to minimize accidents, explosions, fires, and dangerous conditions, and protect the public and the gas corporation workforce.	I. 5 Workforce Safety I. 6. Rewarding Safety Excellence II. Safety Culture III. Process Safety IV. 2. d. Measurement and Control (M&C) IV. 3. Risk Management Process IV. 5. a. iv. Pipeline Patrol IV. 5. b. Pipeline Markers IV. 5. f. Vintage Pipe Replacement IV. 5. h. Corrosion Control IV. 5. j. Leak Survey IV. 5. l. Overpressure Elimination Initiative IV. 7. b. Operations Clearance Procedure

PUC Section	Section Location(s) in Gas Safety Plan
	IV. 7. Mitigating the Risk of Inadequate Response and Recovery IV. 7. c. Security IV. 7. d. Valve Automation V. Workforce
961 (d) (2): Identify the safety-related systems that will be deployed to minimize hazards, including adequate documentation of the commission-regulated gas pipeline facility history and capability.	IV. 4. Records and Information Management IV. 5. e. Strength Testing VI. Compliance Framework VII. 2. Quality Management
961 (d) (3): Provide adequate storage and transportation capacity to reliably and safely deliver gas to all customers consistent with rules authorized by the commission governing core and noncore reliability and curtailment, including provisions for expansion, replacement, preventive maintenance, and reactive maintenance and repair of its commission-regulated gas pipeline facility.	IV. 2. a. Gas Storage IV. 2. c. Transmission Pipe IV. 2. d. Measurement and Control (M&C) IV. 2. e. Distribution Mains and Services IV. 2. f. Customer Connected Equipment IV. 2. g. Liquefied Natural Gas and Compressed Natural Gas IV. 5. c. Distribution Pipeline Replacement IV. 5. f. Vintage Pipe Replacement IV. 5. h. Corrosion Control IV. 5. m. Community Pipeline Safety Initiative IV. 6. a. System Capacity Design Criteria IV. 7. a. Gas Systems Operations and Control VII. 2. Quality Management

PUC Section	Section Location(s) in Gas Safety Plan
961 (d) (4): Provide for effective patrol and inspection of the commission-regulated gas pipeline facility to detect leaks and other compromised facility conditions and to effect timely repairs.	IV. 5. a. Damage Prevention IV. 5. a. i. Public Awareness IV. 5. a. iii. Locate and Mark Program IV. 5. a. iv. Pipeline Patrol IV. 5. d. Cross-Bore Mitigation IV. 5. g. In-Line Inspection IV. 5. j. – Leak Survey IV. 5. k. – Leak Repair VI. 4. Supportive Controls
961 (d) (5): Provide for appropriate and effective system controls, with respect to both equipment and personnel procedures, to limit the damage from accidents, explosions, fires, and dangerous conditions.	II. 1. c. Material Problem Reporting III. Process Safety IV. 2. f. Customer Connected Equipment IV. 2. g. Liquefied Natural Gas and Compressed Natural Gas IV. 5. l. Overpressure Elimination Initiative IV. 7. Mitigating the Risk of Inadequate Response and Recovery IV. 7. a. Gas System Operations and Control IV. 7. c. Security IV. 7. d. Valve Automation V. 3. Workforce Training V. 4. Gas Operator Qualifications V. 5. Contractor Safety and Oversight

PUC Section	Section Location(s) in Gas Safety Plan
	VII. 5. Benchmarking and Best Practices
961 (d) (6): Provide timely response to customer and employee reports of leaks and other hazardous conditions and emergency events, including disconnection, reconnection, and pilot-lighting procedures.	I. 4. Public Safety IV. 5. k. Leak Repair IV. 7. a. Gas Systems Operations and Control IV. 7. d. Valve Automation IV. 7. e. Emergency Preparedness and Response
961 (d) (7): Include appropriate protocols for determining maximum allowable operating pressures on relevant pipeline segments, including all necessary documentation affecting the calculation of maximum allowable operating pressures.	IV. 5. e. Strength Testing IV. 5. l. Overpressure Elimination Initiative
961 (d) (8): Prepare for, or minimize damage from, and respond to, earthquakes and other major events.	IV. 5. i. Earthquake Fault Crossings IV. 7. e. Emergency Preparedness and Response
961 (d) (9): Meet or exceed the minimum standards for safe design, construction, installation, operation, and maintenance of gas transmission and distribution facilities prescribed by regulations issued by the United States Department of Transportation in Part 192 (commencing with Section 192.1) of Title 49 of the Code of Federal Regulations.	IV. 1. Asset Management System
961 (d) (10): Ensure an adequately sized, qualified, and properly trained gas corporation workforce to carry out the plan.	V. Workforce
961 (d) (11): Any additional matter that the commission determines should be included in the plan.	PG&E is not aware of any additional matters the commission has requested be included.
961 (e): The commission and gas corporation shall provide opportunities for	II. Safety Culture

PUC Section	Section Location(s) in Gas Safety Plan
meaningful, substantial, and ongoing participation by the gas corporation workforce in the development and implementation of the plan, with the objective of developing an industrywide culture of safety that will minimize accidents, explosions, fires, and dangerous conditions for the protection of the public and the gas corporation workforce.	V. 6. Partnership with Labor Unions
961 (f): Nothing in this section limits the obligation of a gas corporation to provide adequate service and facilities for the convenience of the public and its employees pursuant to Section 451 or the authority of the commission to enforce that obligation under state law.	Not applicable.
963 (b) (3): It is the policy of the state that the commission and each gas corporation place safety of the public and gas corporation employees as the top priority. The commission shall take all reasonable and appropriate actions necessary to carry out the safety priority policy of this paragraph consistent with the principle of just and reasonable cost-based rates.	The contents of PG&E's Gas Safety Plan provide a view into the safety activities PG&E pursues every day and highlights the specific safety work performed in 2022. This Plan explains how PG&E puts the safety of the public, customers, employees and contractors first, and how the Company has made safety investments in processes and infrastructure that are consistent with best practices in the gas industry.

PACIFIC GAS AND ELECTRIC COMPANY

ATTACHMENT 2

CHANGE LOGS FOR PG&E'S ASSET MANAGEMENT PLANS, GAS EMERGENCY RESPONSE PLAN, AND COMPANY EMERGENCY RESPONSE PLAN

A. Change Log

Table 5 summarizes revisions since the previous publication of GP-1100: Strategic Asset Management Plan," Revision 8, 04/21/2021.

Table 5 – SAMP Change Log

Revision 9 Changes			
Section	**Change**	**Reason for Change**	**Implication of Change**
Entire Document	Updated "Gas Operations" to "Gas" to reflect and include both "Gas Operations" and "Gas Engineering". "Gas" also defined in footnote.	Change in the Gas organizational structure required updating SAMP for alignment.	Updated Information
Entire Document	General annual updates. Updated language and figures to reflect updates made in 2021. Updated use of acronyms where appropriate. Updated titles to reflect organizational changes.	These are general updates that require annual refresh or updates that help refine the document's messaging.	Updated Information
1. Introduction	Updated PG&E's "Mission and Vision" to the new "Purpose, Virtues, and Stands".	Updated to align with Senior Leadership's vision of the company.	Updated information in the SAMP may also require alignment in the individual AMPs.
1.2 Gas Safety Excellence Management System	Added definitions of "asset management" and "process safety" to introduce a series of bullets. Also added references to relevant SharePoint links.	Additional language provides better introduction into section.	Updated Information
2.2 Asset Family Overview	General updates to Asset Family descriptions.	Descriptions refreshed to align with 2022 asset knowledge.	Updated Information
2.4 Asset Management Planning Process	Moved mention of CAP to Section 5, "Continuous Improvements."	Implications of CAP outcomes are better aligned with Section 5, "Continuous Improvements."	Updated Information

Revision 9 Changes (continued)			
Section	**Change**	**Reason for Change**	**Implication of Change**
2.6 Risk Management Process	Added comments around future RSE integration into prioritization discussions.	As RSEs mature, more internal and external emphasis will be put on these values to support work prioritization efforts.	AMPs may consider including RSE values from the 2023 Rate Case.
4. Roles and Responsibilities	Updated Roles and Responsibilities to be consistent with the current management structure and aligned responsibilities where appropriate.	Consistency	Updated Information
5. Continuous Improvement	Added sub-headings to provide better context of the various paragraphs. Moved the mention of CAP to this section from 2.4.	Readability	Updated Information
Table 7 Structure of the Asset Management Plans (AMPS)	Modified Appendix so that all AMPs would have alignment. Reserved appendices for future use.	Creates alignment between all AMPS.	Individual AMPs will need to conform to this structure

F. Change Log

The following Table 19 summarizes revisions for Revision 9, since the previous publication of GP-1101, "Transmission Pipe Asset Management Plan," Revision 8, which was published August 2021.

Table 19. Asset Management Plan Change Log

Section	Change	Reason for Change	Implication of Change
Entire Asset Management Plan	Updated statistics, tables, and figures	Annual data update	Updated content
Section 1	No change	—	—
Section 2	Updated statistics, tables, and figures	Annual data update	Updated content.
Section 3	Updated	Consistency with other asset management plans	Updated with current business risk practices. Removed reference to risk evaluation tool for transmission pipe.
Section 4	Updated	Strategic objectives, annual update	Revised and updated content around revised strategic objectives.
Section 4.2	Updated	Annual update	Removed reference to SCADA visibility, and added GT system capacity.
Section 5	Updated	Annual update	Documents recent results and forward-looking continuous improvement.
Appendix B	Updated	Annual update	Improved threat knowledge.
Appendix C	No change		
Appendix D	Updated	General update	None
Appendix E	Updated	General update	Added "Human Other Force" (HOF).
Appendix F	Updated	General update	None
Appendix G	No change		
Appendix H	Updated	Annual update	Updated status of R&D projects.
Appendix I	Updated	Added second region	Added summary content for second region.
Appendix J through N	Added	Future placeholders	In accordance with SAMP, added placeholders for future common appendices.
Appendix O	Updated	Annual update	None

F. Change Log

Table 16 summarizes revisions to the publication of the GP-1102: DMS Asset Management Plan, Revision 8a, August 2021.

Table 16. Asset Management Plan Change Log

Revision 9 (Publication Date: DRAFT Effective Date: DRAFT)			
Section	**Change**	**Reason for Change**	**Implication of Change**
Entire Asset Management Plan	Updated tables, figures, and asset inventory information Removed references to "Gas Operations" and changed to "Gas" due to organizational change bifurcating Gas into Operations and Engineering	Updated with Current Data	Updated Information
Section 2.2.1	Added verbiage on Copper Service program concluding and transitioning to MAT 50B	Updated Information	Updated Information
Section 2.2.2	Included methane emission reduction into reason for replacement of assets.	Updated Information	Updated Information
Section 2.2.3	Updated sub-threats excluded from Distribution Mains condition assessment	Updated Information	Updated Information
Section 2.2.3	Clarified "pre" statements with "(excludes)" statements to provide further clarity → i.e., pre-1941 (excludes 1941)	Provide clarity on what is and is not included	Updated Information
Section 2.2.4	Updated sub-threats excluded from Distribution Mains condition assessment	Updated Information	Updated Information
Section 3.1.1	Aligned Gas Risk section with other AMPs and updated data to current data	Updated with current data. Alignment with other AMPs	Updated Information
Section 3.2	Aligned threat categories to be consistent wtih Code of Federal Regulations (CFR) Title 49, Transportation, Part 192—Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, Subpart P, "Gas Distribution Pipeline Integrity Management (IM)," Section (§) 192.1007, "What are the required elements of an integrity management plan?," Subsection (b), "Identify threats."	Updated Information	Updated Information
Section 4	Aligned Strategic Objectives to newly established Gas Themes	Updated Information	Updated Information
	Updated Table 7. Program Summary for Plastic Pipeline Replacement Program to include all pre-1985 Aldyl-A and pre-1985 plastic pipe	GRC data request committed to updating to include "all" pre-1985 Aldyl-A	Updated Information

Revision 9 (Publication Date: DRAFT Effective Date: DRAFT)			
Section	**Change**	**Reason for Change**	**Implication of Change**
Section 4.2	Included possible inclusion of post-1940 higher risk steel pipe	Updated Information	Updated Information
Section 4.2	Updated Table 7. Program Summary to align with current programs	Updated Information	Updated Information
Section 5.3	Added information about communications from industry associations	Updated Information	Updated Information
List of Appendices	Updated appendices to align with direction from GP-1100	Updated Information	Updated Information
Appendix B	Updated Threat Matrix as approved in the Risk and Compliance Committee Meeting on 4/18/2022.	Updated Information	Updated Information
Appendix C	For Asset Family Risks provided additional context and reference to RAMP and DMS Risk Drivers.	Added content and alignment with other Asset Family AMPs	Added content
Appendix E	Ensured all Acronyms and Abbreviations included in Table.	Updated Information	Updated Information
Appendix I	Added DMS Climate Vulnerabillty Assesssment for Region 2 – Central Valley. Region 3 – 5 will be available after publication of this AMP and will be included in the next revision.	Added content available for inclusion in this revision	Added Content
Appendix P	Added Appendix P discussing the Monthly Operating Review for Asset Family Strategic Objectives in-concert with CAPN 122064143	Asset Management Maturity	Added Content

F. Change Log

The following table summarizes revisions since the previous publication of GP-1103: Customer Connected Equipment Asset Management Plan, Revision 8, August 2021.

Table 13. Asset Management Plan Change Log

Section	Change	Reason for Change	Implication of Change
Entire Asset Management Plan	Updated tables, figures, and asset inventory information Removed references to "Gas Operations" and changed to "Gas" due to organizational change bifurcating Gas into Operations and Engineering	Updated with current data	Updated Information
Section 2.2.1	Updated information pertaining to the statistical meter performance control program and the periodic meter change program	Aligned information to the Gas Meter Performance Control Program report for 2021	Updated Information
Section 3.1.1	Aligned Gas Risk section with other AMPs and updated data to current data	Updated with current data Aligned with other AMPs	Updated Information
Section 3.2	Aligned threat categories to be consistent with Code of Federal Regulations (CFR) Title 49, Transportation, Part 192—Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards, Subpart P, "Gas Distribution Pipeline Integrity Management (IM)," Section (§) 192.1007, "What are the required elements of an integrity management plan?," Subsection (b), "Identify threats."	Updated Information	Updated Information
Section 4	Aligned Strategic Objectives to newly established Gas Themes	Updated Information	Updated Information
Section 4.1	Added the Gas Meter Performance Control Program as a mitigation	Updated Information	Updated Information
Section 5.3	Added information about communications from industry associations	Updated Information	Updated Information
List of Appendices	Updated appendices to align with direction from GP-1100	Updated Information	Updated Information
Appendix B	Updated threat matrix as approved in Risk and Compliance Committee Meeting on 06/27/2022	Updated Information	Updated Information
Appendix E	Ensured all Acronyms and Abbreviations included in Table.	Updated Information	Updated Information

Section	Change	Reason for Change	Implication of Change
Appendix I	Added DMS Climate Vulnerability Assessment for Region 2 – Central Valley. Region 3 – 5 will be available after publication of this AMP and will be included in the next revision.	Added content available for inclusion in this revision	Added Content
Appendix K	Added Appendix K discussing the Monthly Operating Review for Asset Family Strategic Objectives in-concert with CAPN 122064143	Asset Management Maturity	Added Content

G. Asset Life Cycle

The table below maps the CCE asset family strategic objectives to the four life cycle phases.

Table 14. Strategic Objectives Supporting Life Cycle Phases

Life Cycle Phase	Key Life Cycle Management Manuals and Guidance Documents	Strategic Objective
1. Plan / Design	• TD-4950M, *Gas Design Standards Manual* • TD-4850P-01, "Gas Distribution Integrity Management Program"	3. Develop and incorporate DIMP specifications in the purchasing specification request for the next generation of SmartMeters, including consideration of seismic shutoff capability 5. Identify all Indoor Meter Sets and deploy meter methane detectors by 2030
2. Build / Acquire	• TD-4950M, *Gas Design Standards Manual* • TD-9004M, "Applicant Design Guide"	3. Develop and incorporate DIMP specifications in the purchasing specification request for the next generation of SmartMeters, including consideration of seismic shutoff capability 5. Identify all Indoor Meter Sets and deploy meter methane detectors by 2030.
3. Operate / Maintain	• TD-4192M, *Operations and Maintenance Manual for Gas Operations* • TD-6100S, "Field Services Operating Practices"	1. Reach a steady state of 60,000–70,000 pending nonhazardous meter set leaks for repair annually 5. Identify all Indoor Meter Sets and deploy meter methane detectors by 2030.
4. Retire	• TD-9500P-16, "Abandonment of Underground Gas Facilities" • TD-6100P-09, "Discontinue Gas Service"	2. Identify and remove problematic regulators by 2022 4. Develop a vintage regulator replacement program by December 1, 2022

In addition to aligning the CCE strategic objectives to the four life cycle phases, the CCE asset family also focused on the life cycle costs to maintain the Meter Set Assemblies as shown in the analysis below.

F. Change Log

The following table summarizes revisions since the previous publication of Gas Plan GP-1104: Measurement and Control Asset Management Plan, Revision 8, August 2021.

Table 16. Asset Management Plan Change Log

Section	Change	Reason for Change	Implication of Change
Entire Asset Management Plan	Updated to previous version of Asset Management Plan dated August 7, 2021	Updated information regarding fleet of M&C assets; areas of progress and continuous improvement associated with M&C assets	Updated information
Section 2.2	Updated asset inventory count, updated Transmission Station Age Distributions figures, updated Station Age Statistics table, updated Asset Health Commentary table	Annual update	Updated information
Section 3	Updated content on Enterprise risk management process; added bowtie for Loss of Containment Enterprise Risk Model	New information available	Updated information
Section 4	Updated strategic objectives along with target(s)/metric(s)	Annual update	Updated information
Section 5.1	Updated progress and challenges associated with strategic objectives.	Annual update	Updated information
Section 5.4	Modified introduction to R&D	More accurately reflects objectives of efforts	Updated information
Appendix A	Updated appendix “Related Documents"	Updated list	New information
Appendix B	Updated Threat Matrix	Annual update	Updated information
Appendix C	Updated to include only risks not covered by Enterprise Risk Models	Change in intent of appendix	Updated information
Appendix D	Updated based on reorganization	Update to accurately reflect roles and responsibilities	Updated information
Appendix H	Updated appendix “Research & Development”	Updated R&D projects that apply to the M&C asset family	Updated information
Appendix I	Updated Obsolescence Management Section	Need to accurately reflect current obsolescence issues	Updated information
Appendix J	Updated Region 1 information and added Region 2 information.	New information available	New information
Appendix M	Updated to latest version of plan	Annual update	Updated report

F. Change Log

The following table summarizes revisions since the previous publication of GP-1105: Compression & Processing Asset Management Plan, Revision 7, 08/07/2020.

Table 17 – Asset Management Plan Change Log

Section	Change	Reason for Change	Implication of Change
Entire Asset Management Plan	Update to previous version of Asset Management Plan dated August 18, 2021	Updated as required based on changes in the prior year	Updated information
Section 2.1	Updated Figure 1 – Transmission Pipeline Map	Annual update	Updated information
Section 2.2	Updated asset inventory, asset condition, asset performance	Changes in asset inventory, improvements, and challenges	Updated information
Section 3.1	Updated content on Enterprise risk management process	Changes based on updates to risk models and scores	Updated information
Section 4	Updated strategic objectives along with target(s)/metric(s)	Annual update	Updated information
Section 5.1	Updated progress and challenges associated with strategic objectives	Annual update	Updated information
Section 5.4	Modified introduction to R&D	More accurately reflects objectives of efforts	Updated information
Appendix A	Updated appendix “Related Documents"	Updated list	Updated information
Appendix C	Updated to include only risks not covered by Enterprise Risk Model	Change in intent of appendix	Updated information
Appendix D	Updated based on reorganization	Update to accurately reflect roles and responsibilities	Updated information
Appendix H	Updated appendix “Research & Development”	Updated R&D projects that apply to the C&P asset family	Updated information
Appendix I	Updated Region 1 information and added Region 2 information	New information available	Added information

Appendix F: Change Log

The following table summarizes revisions since the previous publication of this gas plan in 2021.

Table 42. Changes to the October 2022 Edition

Section	Change	Reason for Change	Implication of Change
Entire Asset Management Plan	Applied an annual update to the content, statistics, tables, and figures throughout the plan. Updated strategic objectives and risk controls and programs. Added portable odorization line of business description, risks, and risk management programs.	Updated content per PG&Es annual review process.	Updated information

F. Change Log

The following table summarizes revisions since the previous publication of Gas Plan GP-1108, "Gas Storage Asset Management Plan," Revision 8, August 2021.

Table 22 – Asset Management Plan Change Log

Section	Change	Reason for Change	Implication of Change
All	Updated figures and tables with 2022 operational data and information	Annual document refresh	N/A – General Updates
1 Introduction	Reorganized and reordered content in section 1 for better presentation of information Added Figure 1 – Natural Gas System Overview	Document improvements	N/A – General Updates
2 Asset Inventory, Condition, and Life Cycle	• Figure 2 – California Underground Storage Capacity and Well Count • Added asset pictorials for asset types • Replaced data table with figure 4 • Updated regulatory overview with 2022 update • Added Figure 5 – Tubing and Packer Conversion graph • Added definitions of capacity, total gas, base case, and working gas capacity • Added figure 6 – current gas storage inventory • Added Table 3 – Failure modes, likelihoods, and hazards • Added figures 7 and 8 that summarize baseline casing inspections • Added new sub section "2.3 Flow Rate Changes" • Added New sub section "Uncertainty of reinspection interval"	Document improvements	N/A – General Updates
3 Risks and Threats	• Refreshed the Threat and Risks section to describe the current risk management process and the transition to the Event Based Risk Register (EBRR). New content on Corporate Risk Register and bow tie analysis	Document improvements	N/A – General Updates

Section	Change	Reason for Change	Implication of Change
	• Added "Storage Relative Risk Model" Section to discuss Storage Risk model • Updated Table 12 and Table 13– Storage Strategic Objectives table to align with 2022 SOs • Added "Storage Asset Management Highlights section" • Added "Storage Asset Management Challenges section"		
4 Desired State, Strategic Objectives, Programs and Risk Mitigations	• Added "Storage Relative Risk Model" Section to discuss Storage Risk model • Updated Table 12 and Table 13– Storage Strategic Objectives table to align with 2022 SOs	Document improvements and annual refresh	N/A – General Updates
5 Areas for continuous Improvement	• Added "Storage Asset Management Highlights section" • Added "Storage Asset Management Challenges section"	Document improvements	N/A – General Updates
Appendices	Updated figures and tables with 2022 operational data and information	Annual document refresh	N/A – General Updates

F. Change Log

The following table summarizes revisions of this AMP when changes occur.

Table 10. Asset Management Plan Change Log August 2022

Section	Change	Reason for Change	Implication of Change
Entire document	Updated all tables and figures to reflect the most current data available.	Program maturity	Updated content
Entire document	Updated to ensure document consistency and updated asset information.	Program maturity	Updated content
Entire document	Changed language throughout to refer to Gas Organization as “Gas” due to bifurcation of Gas Engineering and Gas Operations	Program maturity	None
Appendix K	New	Providing information on the number of data sets identified with Gas Risks and drivers.	None

Document Control

This section contains Pacific Gas and Electric (PG&E) Company information related to the ownership and maintenance of this document. This document undergoes an annual review and update as needed and in compliance with *EMER-2001S, Company Emergency Operations Plans Standard*. The Standard is located on the Guidance Document Library (GDL).

Emergency Preparedness and Response (EP&R) maintains this *Company Emergency Response Plan* (*CERP*). This section, and more specifically the Change Record, shows the updates made to the plan and approval of the plan by the persons responsible for its preparation and maintenance.

Change Record

The following table is used to record all changes made to the plan. It describes the revisions made, the locations of the revisions, the names of the persons responsible for the revisions, and dates of revisions:

Section	Person Responsible for Revision	Change	Date
Throughout	Tracey Vardas	Changed Situation Analysis Unit to Situation Unit on all EOC organization charts and figures.	2/15/2022
Throughout	Dennis McKeown	Replaced “Lines of Business” with “functional areas.”	11/28/2022
Throughout	Various	Grammar and format edits	01/02/2023
1.2	Dennis McKeown	Updated subsection to state that a key element of the CERP is the alignment of PG&E functional areas to the frameworks provided by the NIMS, SEMS, and the NIMS/SEMS component ICS.	12/7/2022
1.3	Dennis McKeown	Replaced Mission, Vision, and Culture statement with True North Strategy statement.	11/23/2022
1.4	Dennis McKeown	Moved “Emergency Planning Assumptions” from “Emergency Management” section (5.3).	10/27/2022
1.4	Dennis McKeown	Added True North Strategy content language.	11/23/2022
1.5.3	Tamyra Walz	Updated definition of Access and Functional Needs customers.	11/29/2022
2.1 & 2.4	Dennis McKeown	Updated gas and electric customer account numbers.	11/9/2022
2.2	Sabrina Bruno	Updated Table 2-1 reference to Electric Transmission and Distribution System Operations.	11/1/2022
2.3	Dennis McKeown	Changed subsection header to “Regional Service Model.”	11/2/2022

Section	Person Responsible for Revision	Change	Date
2.3	Dennis McKeown	Added reference to June 23, 2022 CPUC service model approval and Regional Service Model - Home (sharepoint.com).	11/3/2022
2.3.1.1	Sabrina Bruno	Update subsection content and changed header from "Transmission Operations" to "Electric Transmission."	11/16/2022
2.3.1.2	Dennis McKeown	Updated subsection to reference five regions per Regional Service Model; aligned map graphic consistent with Electric Operations - Home (sharepoint.com) description. Deleted old Field Operations and Division Map.	11/28/2022
2.4	Tamyra Walz	Updated customer service operation types.	11/22/2022
2.5.1	Dennis McKeown	Changed title from Electric Transmission - Grid Emergency Response to Emergency Preparedness & Response; updated language to reflect new EP&R organization.	11/8/2022
2.5.2	Tim Stewart Dennis McKeown	Updated Electric Operations Emergency Management organization description to reflect EP&R component status.	11/15/2022
2.5.2	Dennis McKeown	Deleted separate Electric Operations Emergency organization subsection due to EP&R component status.	12/7/2022
2.8.2	Dennis McKeown	Updated subsection 2.8.2, Incident Teams, to include Electric IMT capability description found in EMER-4501 Standard.	6/2/2022
3	Don Benesh	Moved Concept of Operations from section 8 to section 3.	10/27/2022
3.3.7 and 3.3.7.1	Dennis McKeown	Added two-phase response and recovery "Debris Management Site" language and graphic found in *July 2007 FEMA Public Assistance Debris Management Guide, FEMA Publication 325.*	6/2/2022
4	Don Benesh	Moved Coordination and Communication from section 10 to section 4.	10/27/2022
4.2.1	Dennis McKeown	Updated subsection to note that external agency requests for copies of PG&E IAPs will be addressed by the PIO in coordination with PG&E Legal Counsel.	12/19/2022
4.3.3	Dennis McKeown	Added EMER-3001-Att01 and EMER-3001M-Att02 county and regional state government representative contact list links.	11/3/2021
4.5.2	Tamyra Walz	Updated language to reference standing Customer Strategy Officer at all emergency command center levels.	11/2/2022
4.5.3	Tamyra Walz	Updated Contact Service Centers and PG&E Website subsection language. Added reference to customer communications through the pge.com website.	11/29/2022

Section	Person Responsible for Revision	Change	Date
5	Dennis McKeown	Moved subsection 2.9.4, ICS-Based Incident Management, to section 5.1.	7/7/2022
5	Kathi Berman	Edited first paragraph following header 5, Emergency Management, to state "PG&E's corporate risk management framework is focused on event-based, operational risks" instead of "PGE considers two (2) types of risk: corporate operational and event based."	11/3/2022
5.1	Dennis McKeown	Removed January 2021 windstorm response as an example of ICS-based incident management.	10/21/2022
5.1	Dennis McKeown	Moved "plug and play" ICS Technical Specialist description to subsection 7.4.1.1, Technical Specialist.	10/21/2022
5.2.1	Sid Silva PJ Redmond Dennis McKeown	Updated subsection to include IMT activation criteria.	12/8/2022
5.2.2	Todd Rehrer	Clarified with new text the OEC and EOC SIPT command and control relationship.	5/20/2022
5.4	Dennis McKeown Kathi Berman	Updated threat landscape language to include, in addition to the Risk Register, analysis conducted by functional areas, including analysis based on recent incident or event activation lessons learned.	11/3/2022
5.5.1	Megan Stanton	Updated DASH subsection.	11/8/2022
7.1.7.1	Michael Maskarich	Updated day-to-day Public Safety Specialist activities.	11/1/2022
7.1.8	Alyssa Koo	Replaced references to Legal Officer with "Legal Counsel" and Law advice. Also, removed Legal Counsel position from Command Staff organization chart (Figure 7-2) and within Table 7-1.	5/6/2022
7.3.1 & 7.3.2	Dennis McKeown	Removed I&I Section PSPS and cybersecurity content in lieu of reference to CERP PSPS and Cybersecurity annexes.	12/21/2022
7.4	Dennis McKeown	Updated Planning Section organization chart to align with 2022 EOC Staffing Plan.	11/4/2022
7.5.1	Justin Smith	Added note on use of Federal and State Agency Land Closures verification link when accessing State or Federal lands.	8/24/2022
7.6.1	Eric Boettcher	Updated EOC HR Branch Director roles for natural disasters, PSPS events, and cybersecurity incidents.	10/25/2022
8.1.7	Dennis McKeown	Added reference to back up SRVCC EOC capability.	10/24/2022
8.2.5	Randy Malashus	Updated Vacaville Security Control Center responsibilities; replaced word 'Fairfield' with 'Vacaville' in subsection header.	8/26/2022

Section	Person Responsible for Revision	Change	Date
8.4	Dennis McKeown	Updated per Emergency Field Site Request and Approval Process outlined in January 27, 2021 5MM Emergency Field Site Request document.	6/7/2022
9.3	Tamyra Walz	Removed "Nongovernmental Organizations" from title. Updated subsection language consistent with EMER-7001S, Enhanced Customer and Community Support During All Hazards Standard.	11/29/2022
Figure 2-1	Dennis McKeown	Added Regional Service Model Map	11/2/2022
Figure 5-1	Dennis McKeown	Updated "PG&E Operational Levels and Emergency Facilities" figure to show where IMTs sit.	12/8/2022
Figures 7-8 & 7-9	Jacob Weinberg	Removed REC Liaison position due to efficiencies gained by implementation of Foundry-based PSPS Damage/Hazard QC Tool.	4/29/2022
Figure 7-10	Stephen Stroup	Updated I&I Section cybersecurity organization chart.	11/22/2022
Appendix A	Dennis McKeown	Added Energy Management System (ENS) to acronym list and glossary descriptions.	7/29/2022
Appendix A.2	Tamyra Walz	Updated Community Resource Center language to align with language used in CERP PSPS and Earthquake annexes.	11/8/2022
Appendix B	Dennis McKeown	Added Regional Service Model aligned PG&E Regions and Divisions map. Deleted old Field Operations and Division Map.	11/28/2022
Appendix E	Dennis McKeown	Updated to reflect use of ICS 230 form and the synchronization of meetings, report distribution and report information submission times as part of the EOC IAP process.	10/25/2022
Appendix E	Dennis McKeown	Updated E.7.3 agenda to include CSO and LNO brief outs.	12/7/2022
Appendix F	Dennis McKeown	Updated Table 11-6 to reference ICS forms available for use on the EOC SharePoint.	10/26/2022
Appendix G.1	Dennis McKeown	Updated contact phone number for MCV emergency call	01/02/2023

Recision Log

Document Number	Title
NA	NA

Reference Documents

Document Number	Title
EMER-01	Emergency Preparedness and Response Policy

Document Control

Gas Emergency Preparedness (GEP), part of Gas System Operations (GSO), maintains the *Gas Emergency Response Plan Annex (GERP)* to the *Company Emergency Response Plan (CERP)*. This section records the revisions made to the GERP, the responsible persons for its preparation, maintenance, and update, and signature authorities for Plan approval.

Change Record

The following table shows changes made to the Plan since the last revision (Version 12.0).

Where?	What Changed?	Who Initiated the Change?
Throughout	Grammar and format updates	Don Benesh
Throughout	LOB/FBU changed to FU (Functional Unit)	Don Benesh
Document Control	Added Change Request Form section	Don Benesh
Figure 1-1	Updated to identify Cybersecurity Annex	Don Benesh
1.2.1	Deleted heading	Walt Chacon
1.2.1.1	Renumbered to 1.2.1	Don Benesh
1.2.1.2	Deleted Heading and section	Walt Chacon
1.3	Added TSA to bullet list	Barbara Weber
1.4.1	Identified 5 regional EPCs	Eric Sanders
1.5.4, Table 1-1	Under Gas Storage Well – deleted reference to local plans	Jennifer Scoggins
1.6.1	Added reference to TSA	Barbara Weber
2.1.2.1	Changed OEC reference to ICP	Eric Sanders
2.1.2.1, Table 2-1	Deleted OEC	Eric Sanders
2.1.2.2	Changed OEC to IMTs	Eric Sanders
2.1.2.2, Table 2-2	Changed Operations Emergency Center to Incident Command Post	Eric Sanders
2.1.3.1	Changed OEC to IPC filed	Eric Sanders
2.1.3.2	Added reference to MCVs online request site	Dennis McKeown
2.2.1.1	Deleted the last bullet “manages and maintains OEC…	Eric Sanders
2.2.1.2.1	Replaced reference to trained resources with reference to IMTs	Eric Sanders
2.2.1.2.2	Deleted reference to OEC	Eric Sanders
2.2.1.2.4	Second bullet list: deleted last bullet referencing GETS	Eric Sanders
2.2.2.5	Deleted reference to OEC	Eric Sanders

Where?	What Changed?	Who Initiated the Change?
3.4.2.1.1	Second bullet list: deleted last bullet referencing Unified command and new paragraph and Figure 3-1 explaining Unified Command	Dennis McKeown
3.4.4.12.3	List under Pipeline Patrol: add text explaining TIMP	Eric Sanders
3.4.4.12.5	Bullet List Under **Flooding** and **Uncontrolled Flow from Storage Well** updated	Jennifer Scroggins
3.4.04.12.6	Text updated	Mike Fernandez
3.4.4.13.2	Text updated	Mike Fernandez
3.4.4.13.4 (1)	Last two bullets updated	Mike Fernandez
4.2.1.3	Added reference to "magnitude M3.5 or greater"	Derek Kent
4.3.2	Added reference to "externa" agency's	Eric Sanders
4.3.2.1	Deleted reference to "or on scene personnel"	Mike Maskarich
4.3.2.2	Changed "Public" to "Local Government"	Mike Maskarich
A.2	Added TSA, Security Directives Pipeline	Barbara Weber
A.2	Added 49 U.S.C reference for TAS Security Directives	Barbara Weber
B.1	#19: Added reference to TSA / CISA	Barbara Weber
B.4	Gas Curtailment section: Replaced "Zones Valves Binders" with "Shutdown Zones"	Mike Fernandez
B.4	Gig-In section: Replaced "Zones Valves Binders" with "Shutdown Zones"	Mike Fernandez
B.4	Cybersecurity Incident section: updated first bullet list	Barbara Weber
B.4	Cybersecurity Incident (Consider) section: updated with TSA and CISA	Barbara Weber

Recision Log

Document Number	Title
NA	NA

Reference Documents

Document Number	Title
	[See Appendix A.2]

PACIFIC GAS AND ELECTRIC COMPANY

ATTACHMENT 3

GAS SAFETY PLAN CHANGE LOG

Attachment 3
Change Log for 2023 Gas Safety Plan

This attachment lists notable changes in both the report narrative and the attachments between PG&E's 2022 Gas Safety Plan and 2023 Gas Safety Plan.

Section	Change Log	Change Description
I	Introduction	Added reference to number of transmission and distribution regulator stations.
I.3.a	PG&E's Goals	PG&E uses the Company's True North Strategy to create functional Plan on a Page (POP) that outline the strategic goals and initiatives for the year. Gas' POP focuses on Safety, Quality, Delivery, Cost, and Morale.
I.4	Public Safety	PG&E experienced 0.87 third party dig-ins per 1,000 Underground Service Alert (USA) tickets, outperforming its 2022 target of 0.92 third-party dig-ins per 1,000 tickets. This is PG&E's lowest third-party dig-in rate since PG&E began tracking this metric in 2010.
I.5	Workforce Safety	In 2022, Gas had 69 Days Aways, Restricted, or Transferred (DART) cases. This is a reduction of 22 cases from 2021.
I.5	Workforce Safety	Introduced the Blackline Safety Worker monitoring devices which allow vulnerable coworkers to send distress call which immediately notifies emergency response resources.
II	Safety Culture	PG&E championed the Industrial Athlete Specialist (IAS) Team for frontline employees and provided leaders with the necessary injury data to aid in implementation of injury prevention measures. 97.3% of coworkers with a resolved discomfort case did not have a new MSD-related worker's compensation claim within six months after case closure.
II.1	Coworker Engagement	Added sections on Role of the Supervisor, and Joy at Work emphasizing PG&E's stand that it is enjoyable to work with and for PG&E.
II. 2	PG&E Corporate and Gas Safety Committees	Updates to Committees and Meetings including Safety Technical Council, PMVI DOR, and DART DOR.
II. 2. b	Gas Grassroots Safety Teams	Updated with 2022 Gas Grassroots highlights including the additional qualification of more internal SMITH system instructors and the hosting of several safety summits.
III	Process Safety	Addition of narrative for contribution to PSEMS, and criteria for identifying SCE.
IV.2	Asset Family Structure	Please see Attachment 02 to this report for changes to Asset Management Plans for each Asset Family
IV.2.a	Gas Storage	Completed Turner Cut South pipe replacement project and updated number of wells within asset family.
IV.2.b	Compression and Processing	Total number of compressor unscheduled outages exceeds performance expectations in 2022. Target was 224 outages. Actual experienced outages were 136.
IV.2.c	Transmission Pipe	In-Line Inspection - upgraded 242.9 miles and inspected 494.9 miles in 2022, the most mileage ever inspected in a year.
IV.2.e	Distribution Mains and Services	PG&E received the closure letter from the National Transportation Safety Board (NTSB) regarding safety recommendations made to PG&E in 2021 as a result of an investigation of a 2019 third-party strike and fire in San Francisco, California.
IV.2.h	Data	The role of the Chief Data and Analytics Officers was expanded to include the IT role of Chief Information and Security Officer.
IV.3	Risk Management	In December of 2022, the CPUC issued Decision (D.) 22-12-027 on Phase II of the Order Instituting Rulemaking to Further Develop a Risk-Based Decision-Making Framework for Electric and Gas Utilities (R.20-07-013). A key change in the decision is a shift from a Multi-Attribute Value Function approach to a Cost-Benefit approach that includes standardized dollar valuations of safety, electric reliability, and gas reliability consequences from risk events.
IV.4	Records and Information Management	Gas Transmission Remedy E.07 to analyze and mitigate 71 Gas Transmission shared drives was closed.
IV. 5. a	Damage Prevention	Addition of narrative for Time to Resolve Hazardous Conditions as part of Safety Operational Metrics
IV. 5. a	Public Awareness	Updated Public Awareness Highlights table for 2022 to include a link to view a Safe Digging Webinar.
IV.5.g	In-Line Inspection	As of end of year 2022, 49 percent of PG&E's gas transmission pipeline system is piggable.
IV. 5. n	Gas Transmission Vegetation Management	New figure demonstrating an example of trees/brush inspection site.
V. 3	Workforce Training	Updated highlights for 2022 including the Running a Crew as a Crew Leader training program, and the addition of 18 new residential meter set outlets pressurized with air at the Winters Training Facility.
VII.1.a	Electric and Gas Performance and Process Improvement Team	Introduces PG&E's newly formed Electric and Gas Performance and Process Improvement team, and lists their accomplishments for 2022.
VII. 2	Quality Management	Updated list of accomplishments for 2022 including the launch of a new GPOM protocol, and the creation of new weekly and monthly dashboards for functional areas.
VII. 4	Research and Development and Innovation	Focused on new 2022 projects including the completion of the Hydrogen to Infinity project, and the installation of additional GNSS base stations.

VERIFICATION

We, the undersigned, state:

We are officers of PACIFIC GAS AND ELECTRIC COMPANY, a California corporation, and are authorized to make this verification for and on behalf of said corporation, and we make this verification for that reason. We have read the foregoing 2023 Gas Safety Plan, and are informed and believe the matters therein are true and, on that ground, we allege that the matters stated therein are true.

We declare under penalty of perjury under the laws of the state of California that the foregoing is true and correct.

Executed at San Ramon, California, on March 15, 2023.

Christine Cowsert
SENIOR VICE PRESIDENT
GAS ENGINEERING
PACIFIC GAS AND ELECTRIC COMPANY

Joseph Forline
SENIOR VICE PRESIDENT
GAS OPERATIONS
PACIFIC GAS AND ELECTRIC COMPANY