



Risk Assessment Mitigation Phase

Risk Mitigation Plan

Workforce Planning

(Chapter SCG-7)

November 30, 2016



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Executive Summary

The purpose of this chapter is to present the mitigation plan of Southern California Gas Company (SoCalGas) for the risk of Workforce Planning. The Workforce Planning risk covers the risk of not having an appropriate workforce with the right skills to meet business needs due to the acceleration of workforce attrition and changing business needs. SoCalGas' 2015 baseline mitigation plan for this risk consists of five controls:

1. Workforce Planning
2. Knowledge Transfer
3. Training
4. Training – Technical Non-Human Resources (HR)
5. Succession Planning

These controls focus on safety-related impacts (i.e., Health, Safety, and Environment) per guidance provided by the California Public Utilities Commission (Commission or CPUC) in Decision (D.) 16-08-018 as well as controls and mitigations that may address reliability. SoCalGas' proposed mitigation plan comprises both baseline and new mitigation activities.

Based on the foregoing assessment, SoCalGas proposed future mitigations. For Workforce Planning, SoCalGas proposed to continue the five control categories, identified above, but included enhancements within each category. The enhancements include:

1. Workforce Planning
 - Development and maintenance of the workforce planning model
 - Identification of labor force gaps; development of staffing/workforce plans for business units; conducting skills gap analysis; and implementation of workforce planning software
 - Expansion of organizational capabilities assessment to include competency work and job analysis
2. Knowledge Transfer
 - Increase in full time equivalents (FTEs) to conduct the additional activities and all employee participation costs for time spent on knowledge management activities (e.g., workshops, Communities of Practice, technology development, etc.) to create knowledge transfer plans for critical, safety-related roles
3. Training
 - The expansion of Essentials of Supervision, Leadership Training Camp development costs, implementation of the Leadership Challenge, and all employee participation costs to help SoCalGas address skills gaps in leadership and technical skills to promote the safe execution of work
4. Training – Technical Non-HR
 - Revamping and redesigning current technical training
 - Development of a Management Technical Training program to be offered to all new front line supervisors

5. Succession Planning

- Additional FTE to help with the succession planning process for critical roles below the director level to help proactively provide training in advance and mitigate knowledge gaps that could lead to safety incidents

The risk spend efficiency was developed for Workforce Planning. The risk spend efficiency is a new tool that was developed to attempt to quantify how the proposed mitigations will incrementally reduce risk. For Workforce Planning, the risk spend efficiency was completed at the risk portfolio level, with the activities grouped into one, aggregated mitigation. The methodology for calculating the risk spend efficiency was generally based on job proficiency data.

Risk: Workforce Planning

1 Purpose

The purpose of this chapter is to present the mitigation plan of SoCalGas for the risk of Workforce Planning. The Workforce Planning risk covers the risk of not having an appropriate workforce with the right skills to meet business needs due to the acceleration of workforce attrition (as projected by hiring trends and 5-year retirement eligibility rates) and changing business needs. While this risk could have several impacts (e.g., safety, environmental, etc.), the risk mitigation plan set forth herein focuses on safety-related mitigations only.

At the same time, the utility industry is undergoing a significant transformation. A main business objective for SoCalGas is adopting new technologies in order to deliver the safest and most reliable services to its customers. This evolving technological environment is creating a demand for new, additional skillsets. The goal is to have experience in new/emerging technologies, while still maintaining necessary legacy knowledge. SoCalGas' workforce planning mitigation strategies enable the thoughtful transition of retirement eligible employees and, where appropriate, the procurement of skills in new/emerging technologies. One example of orderly transition is the recent voluntary retirement program (VREP). Management offered a voluntary separation package to a select group of retirement eligible employees in areas believed to have skill surpluses to make room for thoughtful technology skill acquisition. SoCalGas has periodically offered similar VREP programs in the past and a small percentage of employees with critical knowledge are expected to accept the recent VREP offering.

This risk is a product of the SoCalGas and San Diego Gas & Electric Company (SDG&E) (collectively, the Companies) September 2015 annual risk registry assessment cycle. Any events that occurred after that time were not considered in determining the 2015 risk assessment, in preparation for this Report. Note that while 2015 is used as the base year for mitigation planning, risk management has been occurring, successfully, for many years within the Companies. The Companies take compliance and managing risks seriously, as can be seen by the numerous actions taken to mitigate each risk. This is the first time, however, that the Companies have presented a Risk Assessment Mitigation Phase (RAMP) Report, so it is important to consider the data presented in this plan in that context. The baseline mitigations are determined based on the relative expenditures during 2015; however, the Companies do not currently track expenditures in this way, so the baseline amounts are the best effort of the company to benchmark both capital and operations and maintenance (O&M) costs during that year. The level of precision in process and outcomes is expected to evolve through work with the Commission and other stakeholders over the next several General Rate Case (GRC) cycles.

The Commission has ordered that RAMP be focused on safety-related risks and mitigating those risks.¹ In many risks, safety and reliability are inherently related and cannot be separated, and the mitigations reflect that fact. Compliance with laws and regulations is also inherently tied to safety and the

¹ D.14-12-025 at p. 31.

Companies take those activities very seriously. In all cases, the 2015 baseline mitigations include activities and amounts necessary to comply with the laws in place at that time. Laws rapidly evolve, however, so the RAMP baseline has not taken into account any new laws that have been passed since September 2015. Some proposed mitigations, however, do take into account those new laws.

The purpose of RAMP is not to request funding. Any funding requests will be made in the GRC. The forecasts for mitigation are not for funding purposes, but are rather to provide a range for the future GRC filing. This range will be refined with supporting testimony in the GRC. Although some risks have overlapping costs, the Companies have made efforts to identify those costs.

At SoCalGas, safety is a top priority and begins with the tone at the top – key to the success of reducing the risk of Workforce Planning is top management demonstrating commitment to safety and leading by example.² This safety-focused tone at the top aspires to reduce the realization of this risk occurring to the extent possible. As stated in American Petroleum Institute's (API) Recommended Practice 1173 and similarly stated by the Commission, “The industry – wide goal of zero incidents requires comprehensive, systemic effort.”³ While SoCalGas shares this ultimate goal of a "vision zero" or incident-free workplace, given that this is a dynamic risk and is centered on human factors by which employees and contractors can make mistakes, SoCalGas' focus in this chapter is on what can be realistically achieved.

Moreover, the large size of SoCalGas' workforce makes achieving an incident-free workplace a challenge. To address this challenge, SoCalGas continues to develop a thoughtful risk assessment to effectively manage over 8,000 employees, considering an increasing turnover rate, a high rate of internal movement, and increasing retirement and separation rate. The risk assessment of Workforce Planning attempts to identify leading indicators (e.g., drivers) and consequences before and when issues occur in conjunction with on-going monitoring and analysis. The scope of this risk focuses on an overall governance framework and related initiatives.

2 Risk Information

As stated in the testimony of Jorge M. DaSilva in the Safety Model Assessment Proceeding (S-MAP) Application (A.) 15-05-004, “SoCalGas is moving towards a more structured approach to classifying risks and mitigations through the development of its new risk taxonomy. The purpose of the risk taxonomy is to define a rational, logical and common framework that can be used to understand analyze and categorize risks.”⁴ The Enterprise Risk Management (ERM) process and lexicon that SoCalGas has put in place were built on the internationally-accepted ISO 31000 risk management standard. In the

² The importance of top management's role in a successful pipeline safety management system is outlined in Pipeline Safety Management System Requirements in the API Recommended Practice 1173, First Edition, June 2014, Draft Version 11.2.

³ Pipeline Safety Management System Requirements in the API Recommended Practice 1173, First Edition, June 2014, Draft Version 11.2 and Safety Policy of the California Public Utilities Commission, July 10, 2014.

⁴ A.15-05-004, filed May 1, 2015, at p. JMD-7.

application and evolution of this process, the Companies are committed to increasing the use of quantification within its evaluation and prioritization of risks.⁵ This includes identifying leading indicators of risk. Sections 2 – 8 of this plan describe the key outputs of the ERM process and resultant risk mitigations.

In accordance with the ERM process, this section describes the risk classification, possible drivers and potential consequences of the Workforce Planning risk.

2.1 Risk Classification

Consistent with the taxonomy presented by the Companies in A.15-05-004, SoCalGas classifies this risk as a cross-cutting risk that affects people and is a function of organizational health. This risk is considered cross-cutting because it touches every department company-wide. The risk classification is provided in Table 1 below.

Table 1: Risk Classification per Taxonomy

Risk Type	Asset/Function Category	Asset/Function Type
CROSS-CUTTING	PEOPLE	ORGANIZATIONAL HEALTH

2.2 Potential Drivers⁶

When performing the risk assessment for Workforce Planning, SoCalGas identified potential drivers, such as those drivers outlined in the Employee, Contractor, Customer, and Public Safety risk, which could lead to a safety incident. Potential incidents that can result pursuant to the Workforce Planning risk can primarily be attributed to a human factor, such as a gap in experience or knowledge to meet business needs.

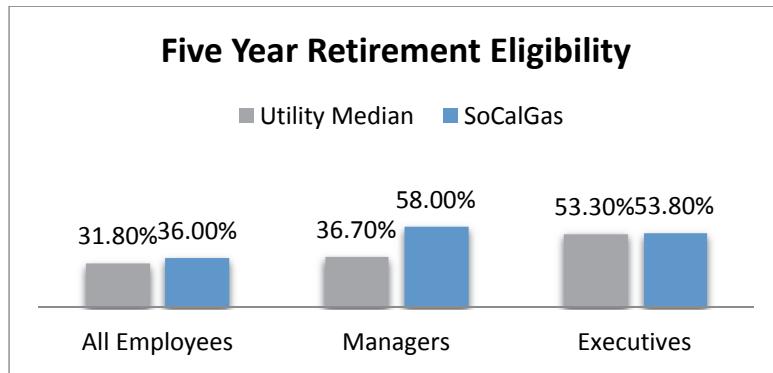
Potential drivers for the Workforce Planning risk include, but are not limited to:

- **Improved economic environment incentivizes employees to find new jobs or retire.**
Improved economic conditions and the resulting impacts are outside the control of SoCalGas. Nonetheless, SoCalGas can plan for increases in retirements through various tools discussed herein, such as succession planning and knowledge management.
- **Aging workforce correlates with higher attrition rates and accelerated job movement due to vacancies.**
At SoCalGas, a growing number of employees are eligible to retire across the company between 2015 and 2025. In fact, SoCalGas currently surpasses the utility industry median for retirement

⁵ Testimony of Diana Day, Risk Management and Policy (SDG&E-02), submitted on November 14, 2014 in A.14-11-003.

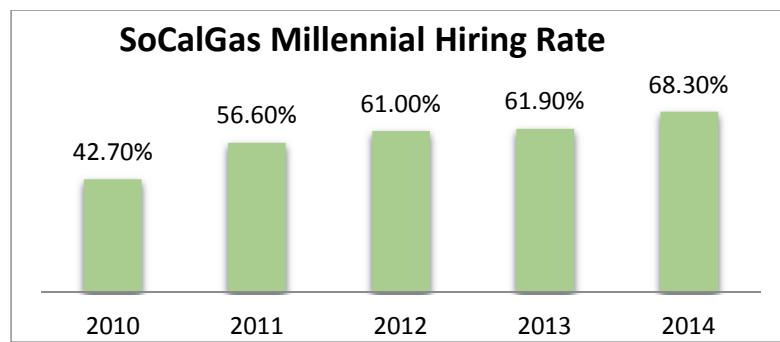
⁶ An indication that a risk could occur. It does not reflect actual or threatened conditions.

eligibility for all employees, especially managers.⁷ As illustrated by the results of a utility benchmarking survey, 36% of employees and 58% of managers will be eligible for retirement in the next five years.



- **An increase of millennial employees more likely to change jobs and companies.⁸**

As workforce attrition increases, so does hiring at SoCalGas. Internal data analysis shows an increasing trend to hire millennials (born after 1980). As the graph below shows, the hiring rate has increased by over 1.5 times between 2010 and 2014, with millennials comprising well over half of employees hired into SoCalGas.



Based on the Bureau of Labor statistics, employees 20-24 years of age tend to move around more within and across organizations.⁹ The graph below shows between 2004-2014, the average job tenure was only 1.3 years compared to 4.9-5.3 years for employees 35-44 years of age.

⁷ Results for retirement eligibility and hiring rate were obtained from the 2015 PwC Saratoga Benchmarking study.

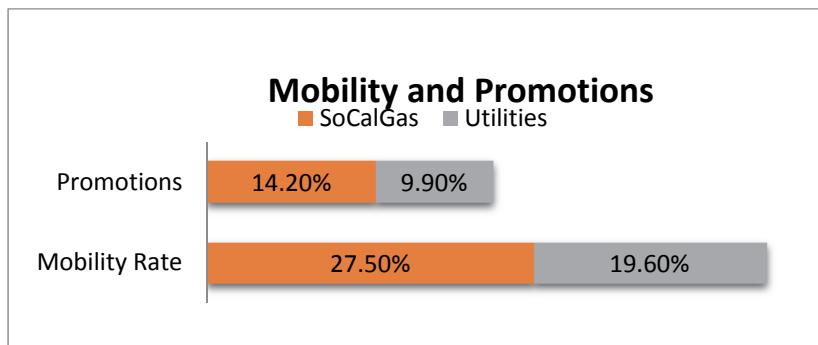
⁸ <https://www2.deloitte.com/content/dam/Deloitte/at/Documents/human-capital/millennial-innovation-survey-2016.pdf>.

⁹ Information and Bureau of Labor statistics chart obtained from: <http://www.eremedia.com/tlnt/dont-look-now-but-your-millennials-are-looking-for-their-next-gig/>.

	1983	1987	1991	1996	2000	2004	2008	2012	2014
TOTAL									
20 to 24 years	1.5	1.3	1.3	1.2	1.1	1.3	1.3	1.3	1.3
25 to 34 years	3	2.9	2.9	2.8	2.6	2.9	2.7	3.2	3
35 to 44 years	5.2	5.5	5.4	5.3	4.8	4.9	4.9	5.3	5.2
MEN									
20 to 24 years	1.5	1.3	1.4	1.2	1.2	1.3	1.4	1.4	1.4
25 to 34 years	3.2	3.1	3.1	3	2.7	3	2.8	3.2	3.1
35 to 44 years	7.3	7	6.5	6.1	5.3	5.2	5.2	5.4	5.4
WOMEN									
20 to 24 years	1.5	1.3	1.3	1.2	1	1.3	1.3	1.3	1.3
25 to 34 years	2.8	2.6	2.7	2.7	2.5	2.8	2.6	3.1	2.9
35 to 44 years	4.1	4.4	4.5	4.8	4.3	4.5	4.7	5.2	5.1

Source: Bureau of Labor Statistics

Increased attrition has led to promotion and mobility rates (14% and 28% respectively) that trend almost 50% higher compared to other utilities nationwide. See illustrative graph below.¹⁰



- Increase in technological changes can challenge employees without the right technical skills.**

New workforce skills or more training for existing workers is needed as SoCalGas continues to promote and adopt the use of technology to help satisfy increasingly complex regulatory and compliance considerations (e.g., environmental, engineering).

¹⁰ Results for mobility and promotion rates were obtained from the 2015 PwC Saratoga Benchmarking study.

- **Increased demand for specialized skills may cause competition in the industry and lead to vacancies.**

At SoCalGas, as attrition among utilities continues, along with various on-going business initiatives, the market for employees with utility-specific skillsets can become more competitive.

The specific risk drivers identified above are based on external reports, utility industry benchmarks and SoCalGas internal data on retirement eligibility, promotions and mobility rates, hiring rates and the changing entry point position,¹¹ and workforce requirements. All of these factors create an environment for increased workforce attrition, which in turn creates labor workforce, skills and knowledge gaps. Thus, as these varying drivers gain momentum, an increasingly active mitigation/control framework (i.e., workforce planning, knowledge management, training, and succession planning initiatives) is needed.

2.3 Potential Consequences

If one of the drivers listed above were to occur, leading to a lack of experience or knowledge gap that results in an employee or contractor error, this could cause a safety-related incident. The potential consequences, in a reasonable worst case scenario, could include:

- Injuries to employees, contractors, customers, and/or the public due to lack of experience;
- Property damage;
- Inefficiencies/increased costs due to lower tenure and limited experience; and/or
- Financial impacts due to environmental, regulatory, civil, and/or criminal violations.

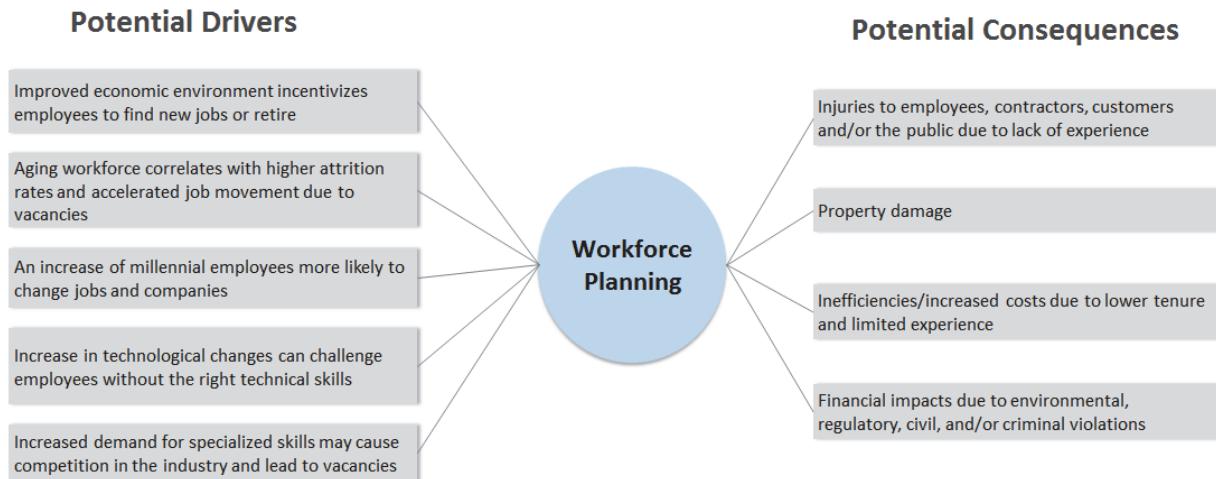
These potential consequences were used in the scoring of the Workforce Planning risk that occurred during the Companies' 2015 risk registry process. See Section 3 for more detail.

2.4 Risk Bow Tie

The risk "bow tie," shown in Figure 1, is a commonly-used tool for risk analysis. The left side of the bow tie illustrates drivers that lead to a risk event and the right side shows the potential consequences of a risk event. SoCalGas applied this framework to identify and summarize the information provided above.

¹¹ With the Meter Reader and Advanced Meter Installer positions concluding in 2017, SoCalGas will have new entry point positions into the organization. Since these positions require more skills and experience, they are referred to as entry point positions, rather than entry level positions.

Figure 1: Risk Bow Tie



The Workforce Planning risk event provided in the center of the bow tie is the shortage of a qualified workforce.

3 Risk Score

The Companies' ERM organization facilitated the 2015 risk registry process, which resulted in the inclusion of Workforce Planning as one of the enterprise risks. During the development of the risk registry, subject matter experts (SMEs) assigned a score to this risk, based on empirical data to the extent it was available and/or using their expertise, following the process outlined in this section.

3.1 Risk Scenario – Reasonable Worst Case

There are many possible ways in which a Workforce Planning risk event can occur. For purposes of scoring this risk, SMEs used a reasonable worst case scenario to assess the impact and frequency. The scenario represented a situation that could be expected to happen, within a reasonable timeframe, and lead to a relatively significant adverse outcome. These types of scenarios are sometimes referred to as low frequency, high consequence events. The SMEs selected the following reasonable worst case scenario to develop a risk score for Workforce Planning:

- An employee performs work that she/he has had minimal experience performing and causes a service disruption, which results in injuries to one or more individuals – whether an employee, contractor, customer or member of the public. A regulatory investigation is opened and/or adverse litigation is initiated.

Note that the following narrative and scores are based on this scenario; they do not address all consequences that can happen.

3.2 2015 Risk Assessment

Using this scenario, SMEs then evaluated the frequency of occurrence and potential impact of the risk using the Companies' 7X7 Risk Evaluation Framework (REF). The framework (also called a matrix)

includes criteria to assess levels of impact ranging from Insignificant to Catastrophic and levels of frequency ranging from Remote to Common. The 7X7 framework includes one or more criteria to distinguish one level from another. The Commission adopted the REF as a valid method to assess risks for purposes of this RAMP.¹² Using the levels defined in the REF, the SMEs applied empirical data to the extent it was available and/or using their expertise to determine a score for each of four residual impact areas and the frequency of occurrence of the risk. Table 2 provides a summary of the Workforce Planning risk score in 2015. This risk has a score of 4 or above in the Health, Safety, and Environmental impact area and, therefore, was included in the RAMP. These are residual scores because they reflect the risk remaining after existing controls are in place. For additional information regarding the REF, please refer to the RAMP Risk Management Framework chapter within this Report.

The scores reflect the possibility of employees lacking the appropriate skills to do jobs that may have a safety or compliance impact. If appropriate safety protocol is not followed (because of lack of proper training and/or knowledge), there can be major consequences.

The scores were also influenced by the need to continue and/or develop leadership skills, understanding that the lack of leadership can affect employee engagement and adherence to safety protocols. The scores are shown in Table 2 below.

Table 2: Risk Score

Residual Impact				Residual Frequency	Residual Risk Score
Health, Safety, Environmental (40%)	Operational & Reliability (20%)	Regulatory, Legal, Compliance (20%)	Financial (20%)		
4	4	4	4	5	5,774

3.3 Explanation of Health, Safety, and Environmental Score

SoCalGas scored Workforce Planning a 4 (Major) in the Health, Safety, and Environmental impact area. Lack of technical knowledge and skills among employees at all levels could lead to one or more serious injuries and illnesses to the public or employees. For leaders with direct reports, without the job knowledge or ability to maintain a fully engaged workforce, mistakes can occur, ultimately leading to incidents. This is especially true for employees within critical jobs related to safety, who need to be fully equipped with the knowledge and skills to perform their work. Without proper knowledge management strategies in place, employees might not possess the knowledge and skills needed to safely perform their job functions.

¹² D.16-08-018, Ordering Paragraph 9.

3.4 Explanation of Other Impact Scores

Based on the selected reasonable worst case risk scenario, SoCalGas gave the following scores to the remaining impact categories:

- **Operational & Reliability:** SoCalGas scored Workforce Planning a 4 (Major). SoCalGas believes it is feasible that customers may experience operational impacts due to inexperienced, untrained employees performing critical tasks. Further, the lack of fully skilled and knowledgeable employees in critical jobs and all supervisory roles could result in an increase in the length of time for completing jobs.
- **Regulatory, Legal, and Compliance:** SoCalGas scored Workforce Planning a 4 (Major), which involves violations that result in financial consequences. If a Workforce Planning event were to occur, it is feasible that SoCalGas may endure penalties. This is also consistent with the score given in the Financial impact area.
- **Financial:** SoCalGas scored Workforce Planning a 4 (Major). A negative outcome in the Regulatory, Legal, and Compliance impact area could have a financial consequence.

In addition to the consequences mentioned above, the lack of fully skilled and knowledgeable employees in critical jobs and all supervisory roles could result in dissatisfied customers and unengaged workers, which can then lead to high turnover.

3.5 Explanation of Frequency Score

The frequency score of 5 (frequent) was based on SoCalGas' current knowledge of the business and historical experience. As mentioned above, SoCalGas could experience a turnover rate of over 36% of its employees in a five-year period, including more than 50% of managers and executives. In addition to the retirement-related turnover, SoCalGas expects additional turnover due to a higher number internal moves and exits related to an increase in millennial hiring. The potential for a skills gap in critical job functions may increase the risk of a safety-related incident if SoCalGas conducts the baseline activities without enhancements further described in Section 5 below. Without an adequate workforce with the right skills, SoCalGas is at risk to experience health, safety, and environmental consequences, including, but not limited to, permanent or serious injuries and illnesses. Therefore, a frequency of an event occurring every 1-3 years is reasonable. SoCalGas needs to update the company's practices to strategically plan for a changing workforce.

4 Baseline Risk Mitigation Plan¹³

As stated above, the Workforce Planning risk covers the risk of not having an appropriate workforce with the right skills to meet business needs due to the acceleration of workforce attrition and changing business needs. The 2015 baseline mitigations discussed below include the current evolution of SoCalGas' management of this risk. The baseline mitigations have been developed over many years to

¹³ As of 2015, which is the base year for purposes of this Report.

address this risk. They include the amount to comply with laws that were in effect at that time. SoCalGas' mitigation plan for this risk includes the following controls:

- Workforce Planning
- Knowledge Transfer
- Training
- Training – Technical Non-HR
- Succession Planning

SMEs from the Corporate Security and Human Resources departments collaborated to identify and document them. These controls focus on safety-related impacts¹⁴ (i.e., Health, Safety, and Environment) per guidance provided by the Commission in D.16-08-018,¹⁵ as well as controls and mitigations that may address reliability.¹⁶ Accordingly, the controls and mitigations described in Sections 4 and 5 primarily address safety-related impacts. Note that the controls and mitigations in the baseline and proposed plans are intended to address various Workforce Planning incidents, not just the scenario used for purposes of risk scoring.

SoCalGas' Workforce Planning mitigation plan addresses each of these components as described below.

1. Workforce Planning

Conducting Workforce Planning provides SoCalGas with the ability to identify, then focus on critical roles within the organization and distinguish the skills needed to adequately perform those jobs. Critical roles are considered to be those roles that have significant safety and operational consequences (e.g., roles in departments such as System Projection, Gas Operations, Customer Services, etc.). Workforce Planning also helps with employee development so that employees have the right skills for current and future jobs within SoCalGas. Workforce Planning aligns with all business units and incorporates the succession planning efforts for a more holistic approach and to better anticipate current and future workforce needs. Not conducting comprehensive Workforce Planning, such as skills assessment, critical role identification, or operational headcount planning, can result in not having enough people and/or the right skills to prevent a safety-related incident.

2. Knowledge Transfer

SoCalGas implements knowledge management strategies to provide employees with the structure, support, and resources necessary to transfer unique knowledge related to critical jobs. Knowledge transfer plans are designed particularly for employees who transition out of critical roles.

¹⁴ The Baseline and Proposed Risk Mitigation Plans may include mandated, compliance-driven mitigations.

¹⁵ D.16-08-018 at p. 146 states “Overall, the utility should show how it will use its expertise and budget to improve its safety record” and the goal of RAMP is to “make California safer by identifying the mitigations that can optimize safety.”

¹⁶ Reliability typically has an impact on safety. Accordingly, it is difficult to separate reliability and safety.

3. Training

Leadership training, such as Essentials of Supervision, Leadership Training Camp, and the Leadership Challenge, is necessary to communicate the safety tone at the top and echo the principles stated in API's Recommended Practice. Due to increased retirements and movement throughout the company, equipping management with the necessary leadership skills, such as communicating SoCalGas' vision, engaging employees in the work that they do, and instilling our safety culture, is essential to the successful implementation of safety-related practices and risk management.

4. Training – Technical Non-HR

Since Workforce Planning is a cross-cutting risk that impacts safety across the entire company, it is important to focus attention on technical training conducted by various business units, in addition to training sponsored by HR. Technical training is covered by other RAMP risks, including Employee, Contractor, Customer, and Public Safety, Catastrophic Damage Involving High-Pressure Pipeline Failure, Catastrophic Damage Involving Medium-Pressure Pipeline Failure, and Catastrophic Damage Involving Gas Infrastructure (Dig-Ins), and includes skills training for employees to perform their jobs safely.

5. Succession Planning

As discussed above, in the next five years, over 50% of managers will be retirement eligible. This does not include all the employees who will transition to other roles, which will further exacerbate knowledge loss. Therefore, formal annual succession planning is critical over the next five years. There are efforts already in place to support accelerated development for newer employees and executives.

5 Proposed Risk Mitigation Plan

The 2015 baseline mitigations outlined in Section 4 will continue to be performed in the proposed plan. SoCalGas believes that continuing the baseline mitigations alone, however, will not enable maintenance of the current residual risk level due to the trends described above regarding acceleration of inexperienced employees and leaders as a result of increased attrition. Accordingly, SoCalGas is proposing during the 2017-2019 timeframe to expand or add the mitigations addressed below.

The benefits of the identified mitigations would help identify shortages in the workforce and skill deficits in critical and leadership roles. This would enable SoCalGas to focus on and create necessary interventions to help address these gaps and to prevent the risk score from further increasing. As identified in the Section 1 above, the data suggest SoCalGas will be experiencing increased attrition both from highly tenured and newer employees, as well as high mobility within the organization, creating the potential for knowledge and skills gaps and potential labor shortages. The levels attributed to this risk are due to potential knowledge, skill, and labor gaps, that may lead to safety and operational issues.

Thus, conducting the 2015 baseline activities alone will not be enough to maintain the current level of risk, due to the changing levels of workforce proficiency.

1. Workforce Planning

Proposed activities include: (1) the development and maintenance of the workforce planning model, (2) identification of labor force gaps, development of staffing/workforce plans for business units, and skills gap analysis – including software implementation for analytics, scenario planning, critical role identification, and (3) expansion of organizational capabilities assessment to include competency work and job analysis. This includes labor and non-labor resources as well as costs associated with time for participating in the proposed activities (employee participation time in trainings, planners' time conducting workforce planning, etc.). For new activities that were added to programs (e.g., job analysis and competency modeling work, workforce planning work, software implementation), the projections were based on the cost of incremental labor and the cost for the software. These workforce planning activities will help SoCalGas appropriately plan for and staff critical, safety-related roles. Critical role identification will be an integral part of this mitigation, which will also facilitate knowledge management and succession planning mitigations below.

2. Knowledge Transfer

Activities included as part of the knowledge transfer program include continuation and expansion of knowledge management function and support, knowledge workshops and the formation of additional specialized groups within certain technical areas who have a common goal and engage on an ongoing basis (i.e., Communities of Practice¹⁷), technology development and implementation, and knowledge transfer plans. The projected resources were based on 2015 costs in addition to estimated vendor costs (both consulting and technology solutions) and labor costs for incremental work. The incremental labor costs are attributed to an increase in FTEs to conduct the additional activities and all employee participation costs for time spent on knowledge management activities. Because of the high number of retirement-eligible employees, the need to accelerate skills, knowledge, and development is key to the success of SoCalGas' focus on safety, especially in specialized/critical roles, such as safety-related roles like cathodic protection or gas compression maintenance roles. These knowledge transfer activities (e.g., workshops, Communities of Practice, technology development, etc.) will help SoCalGas appropriately create knowledge transfer plans for critical, safety-related roles. The expansion of these activities will be based on safety-related roles that will be identified through the proposed workforce planning activities.

¹⁷ Communities of Practice (CoP) is a common term in knowledge management. For more information, see <http://web.stanford.edu/~eckert/PDF/eckert2006.pdf>.

3. Training

Maintaining core leadership training and expanding the use of technology encompass the activities proposed for Training. The activities include the expansion of Essentials of Supervision, Leadership Training Camp development costs, implementation of the Leadership Challenge, and all employee participation costs. The costs for Leadership Training Camp and the Leadership Challenge were forecasted considering 2015 costs. The costs for Essentials of Supervision were based on the estimated numbers of hours it would take to expand and revise the training as well as employee participation time. Employee participation costs were based on 2015 estimated labors hours. Moreover, a new effort to revamp/redesign current technical training using new and emerging technologies was proposed and costs for this included incremental FTEs and software to create the technology-based training solutions. Because SoCalGas is a highly regulated entity, this increases development time to train employees and enhance their productivity. These training activities will help SoCalGas appropriately address skills gaps in leadership and technical skills to promote the safe execution of work. Training for supervisors will be revised and expanded based on company safety data to help reduce employee safety incidents. Training for managers and above focuses on how to engage with employees about safety and how to instill safety culture in employees.

4. Training – Technical Non-HR

Activities within the scope of technical training include revamping and redesigning current technical training. These activities are covered by other RAMP risks including Employee, Contractor, Customer & Public Safety, Catastrophic Damage Involving High-Pressure Pipeline Failure, Catastrophic Damage Involving Medium-Pressure Pipeline Failure, and Catastrophic Damage Involving Gas Infrastructure (Dig-Ins). These activities are included in the Workforce Planning risk to address the cross-cutting nature of this risk and illustrate the impact Workforce Planning has on safety across the entire organization. In addition to the activities proposed by the various RAMP risks for technical training, the Workforce Planning risk also proposes the development of a Management Technical Training program to be offered to all new front line supervisors since currently there is no formal technical training available to front line supervisors. These activities would help develop the technical skills and increase job specific procedural knowledge for employees and supervisors, thereby decreasing the rate of safety-related incidents. Front line supervisors oversee processes that may be hazardous to employees and/or the public; therefore, this proposed training will help minimize potential safety incidents.

5. Succession Planning

Succession planning forecasted activities and costs include the time value for all employees who are part of the succession planning process as well as incorporating discussions about critical roles/employees and knowledge mapping and transfer plans. The forecast for succession planning was based on a trend, since there was approximately a 3% increase in costs per year, establishing a clear upward trend. There are also Succession Planning related labor costs for an additional FTE to help with the succession

planning process for critical roles. While there are efforts already in place to support accelerated development for newer employees and executives, the same amount of effort is not focused on mid-level employees. It is essential that SoCalGas not only focuses on accelerating advancement and development for the new employees and executives, but also mid-level employees as they will likely take over key roles for retiring employees. For example, a mid-level manager or technical expert who possesses critical knowledge currently would not participate in the succession planning process which creates a risk of knowledge loss if the employee vacates the role. Thus, planning for successors of those in critical roles will help to proactively provide training in advance and mitigate knowledge gaps that could lead to safety incidents, as SoCalGas currently does not currently conduct succession planning for any role below the director level.

6 Summary of Mitigations

Table 3 summarizes the 2015 baseline risk mitigation plan, the risk driver(s) control addresses, and the 2015 baseline costs for Workforce Planning. While control or mitigation activities may address both risk drivers and consequences, risk drivers link directly to the likelihood that a risk event will occur. Thus, risk drivers are specifically highlighted in the summary tables.

SoCalGas does not account for and track costs by activity, but rather at an organizational level, based on cost centers. For the purposes of the RAMP, SoCalGas determined the costs provided in Table 4 of the mitigation activities for this risk by considering the cost centers for all labor and non-labor dollars, including cost centers and hourly rates of those employees aiding in gathering workforce planning data, attending knowledge management-related meetings, participating in leadership and technical training, and conducting succession planning. Moreover, cost centers associated with the development of the various activities, as well as external vendor costs, were included as part of the resources noted in Table 3. SoCalGas determined the costs for 2015 and reviewed five years of historical information for years 2011-2015 to analyze patterns and trends. The O&M figures provided in Table 3 were based on costs incurred during base year 2015.

Table 3: SoCalGas Baseline Risk Mitigation Plan¹⁸
(Direct 2015 \$000)¹⁹

ID	Control	Risk Drivers Addressed	Capital ²⁰	O&M	Control Total ²¹	GRC Total ²²
1	Workforce planning tools and templates	<ul style="list-style-type: none"> • Improved economic environment • Aging workforce • An influx of employees who are more prone to change jobs and companies • Fundamental shifts in the business requiring new workforce skills 	n/a	\$2,240	\$2,240	\$2,240
2	Knowledge transfer tools and processes	<ul style="list-style-type: none"> • Aging workforce 	n/a	470	470	470
3	Training i.e., employee development solutions ²³	<ul style="list-style-type: none"> • Employees entering leadership/ supervisory roles with little experience 	n/a	1,900	1,900	1,900

¹⁸ Recorded costs were rounded to the nearest \$10,000.

¹⁹ The figures provided in Tables 3 and 4 are direct charges and do not include company overhead loaders, with the exception of vacation and sick. The costs are also in 2015 dollars and have not been escalated to 2016 amounts.

²⁰ Pursuant to D.14-12-025 and D.16-08-018, SoCalGas provided the “baseline” costs associated with the current controls, which include the 2015 capital amounts. The 2015 mitigation capital amounts are for illustrative purposes only. Because projects generally span several years, considering only one year of capital may not represent the entire mitigation.

²¹ The Control Total column includes GRC items as well as any applicable non-GRC jurisdictional items. Non-GRC items may include those addressed in separate regulatory filings or under the jurisdiction of the Federal Energy Regulatory Commission (FERC).

²² The GRC Total column shows costs typically presented in a GRC.

²³ This item was added in the 2016 registry as a separate item to address overall employee development solutions designed to close skills gaps. In 2015, employee development solutions were included in Targeted Workforce Planning.

ID	Control	Risk Drivers Addressed	Capital ²⁰	O&M	Control Total ²¹	GRC Total ²²
4	Training – Technical non-HR* ²⁴	<ul style="list-style-type: none"> • Employees entering leadership/supervisory roles with little experience • Fundamental shifts in the business requiring new workforce skills 	1,060	23,170	24,230	24,230
5	Formal succession planning	<ul style="list-style-type: none"> • Aging workforce • An influx of employees who are more prone to change jobs and companies 	n/a	150	150	150
	TOTAL COST²⁵		n/a	\$4,760	\$4,760	\$4,760

* Includes one or more mandated activities

While all the controls and baseline costs presented in Table 3 mitigate Workforce Planning risk based on the current state of the workforce, some of the controls also mitigate other risks presented in this RAMP Report. Since Workforce Planning is a cross-cutting risk, it impacts several other RAMP risks. Specifically, non-HR technical training is a compilation of costs outlined in the various RAMP risks including Employee, Contractor, Customer, and Public Safety, Catastrophic Damage Involving High-Pressure Pipeline Failure, Catastrophic Damage Involving Medium-Pressure Pipeline Failure, and Catastrophic Damage Involving Gas Infrastructure (Dig-Ins).

Table 4 summarizes SoCalGas' proposed mitigation plan (which comprises both baseline and new mitigation activities) and associated projected ranges of estimated O&M expenses for 2019, and projected ranges of estimated capital costs for the years 2017-2019. It is important to note that SoCalGas identified potential ranges of costs in this plan, and are not requesting funding approval. The Companies will request approval of funding, in their next GRC. There are non-CPUC jurisdictional mitigation activities addressed in RAMP; the costs associated with these will not be carried over to the GRC.

²⁴ This item is covered in other RAMP risks and is being called out here to demonstrate the cross-cutting nature of the Workforce Planning risk.

²⁵ The total cost does not include the average cost of technical non-HR training in the amount of \$23,170 for O&M and \$1,060 for capital.

The activities outlined in Table 4 include continuation of the 2015 baseline activities and SoCalGas' proposed activities for the 2017-2019 timeframe which expand or add to the baseline mitigations. The unique aspect of this risk is that continuing to do the 2015 baseline activities alone will not be enough to sustain the current residual risk score of 5,774, due to the changing environment and workforce characteristics. Therefore, many of proposed activities will help sustain the current risk level and prevent it from increasing. The incremental resources being proposed include software implementation and FTEs to help manage the additional workforce planning, knowledge management, training, and succession planning activities to help maintain the same levels as the baseline.

The proposed plan would identify workforce pressures and organizations that need additional attention in order to align training, knowledge management, and succession planning efforts so that the right people are in the right jobs with the right skills to mitigate safety risks. The proposed costs started with the baseline 2015 activities, plus costs associated with the additional activities being proposed. The 2019 costs were determined by estimating the labor and non-labor cost for each mitigation strategy based on costs and activities conducted between 2011-2015 and adding incremental activities. The range was developed to provide flexibility with regard to the exact scope and plan for the new incremental activities.

Table 4: SoCalGas Proposed Risk Mitigation Plan²⁶
(Direct 2015 \$000)

ID	Mitigation	Risk Drivers Addressed	2017-2019 Capital ²⁷	2019 O&M	Mitigation Total ²⁸	GRC Total ²⁹
1	Workforce Planning	<ul style="list-style-type: none"> • Improved economic environment • Aging workforce • An influx of employees who are more prone to change jobs and companies • Fundamental shifts in the business 	n/a	\$2,48 - 3,230	\$2,480 - 3,230	\$2,480 - 3,230
2	Knowledge Transfer	<ul style="list-style-type: none"> • Aging workforce • An influx of employees who are more prone to change jobs and companies 	n/a	940 - 1,210	940 - 1,210	940 - 1,210
3	Training	<ul style="list-style-type: none"> • Employees entering leadership/ supervisory roles with little experience 	n/a	2,590 - 3,220	2,590 - 3,220	2,590 - 3,220
4	Training – Technical non-HR*	<ul style="list-style-type: none"> • Employees entering leadership/ supervisory roles with little experience • Fundamental shifts in the business 	2,850 - 3,480	26,230 - 34,510	29,080 - 37,990	29,080 - 37,990
5	Succession Planning	<ul style="list-style-type: none"> • Aging workforce • An influx of employees who are more prone to change jobs and companies 	n/a	230 - 280	230 - 280	230 - 280
	TOTAL COST³⁰		n/a	\$6,240 - 7,940	\$6,240 - 7,940	\$6,240 - 7,940

	Status quo is maintained
	Expanded or new activity
*	Includes one or more mandated activities

²⁶ Ranges of costs were rounded to the nearest \$10,000.

²⁷ The capital presented is the sum of the years 2017, 2018, and 2019 or a three-year total. Years 2017, 2018, and 2019 are the forecast years for the Companies' Test Year 2019 GRC Applications.

²⁸ The Mitigation Total column includes GRC items as well as any applicable non-GRC items.

²⁹ The GRC Total column shows costs typically represented in a GRC.

³⁰ The total cost does not include the O&M and capital cost of technical training outside of HR in the range of \$29,080 - \$37,990.

Risk Spend Efficiency

Pursuant to D.16-08-018, the utilities are required in this Report to “explicitly include a calculation of risk reduction and a ranking of mitigations based on risk reduction per dollar spent.”³¹ For the purposes of this Section, Risk Spend Efficiency (RSE) is a ratio developed to quantify and compare the effectiveness of a mitigation at reducing risk to other mitigations for the same risk. It is synonymous with “risk reduction per dollar spent” required in D.16-08-018.³²

As discussed in greater detail in the RAMP Approach chapter within this Report, to calculate the RSE the Company first quantified the amount of Risk Reduction attributable to a mitigation, then applied the Risk Reduction to the Mitigation Costs (discussed in Section 6). The Company applied this calculation to each of the mitigations or mitigation groupings, then ranked the proposed mitigations in accordance with the RSE result.

6.1 General Overview of Risk Spend Efficiency Methodology

This subsection describes, in general terms, the methods used to quantify the *Risk Reduction*. The quantification process was intended to accommodate the variety of mitigations and accessibility to applicable data pertinent to calculating risk reductions. Importantly, it should be noted that the analysis described in this chapter uses ranges of estimates of costs, risk scores and RSE. Given the newness of RAMP and its associated requirements, the level of precision in the numbers and figures cannot and should not be assumed.

6.1.1 Calculating Risk Reduction

The Company’s SMEs followed these steps to calculate the Risk Reduction for each mitigation:

1. **Group mitigations for analysis:** The Company “grouped” the proposed mitigations in one of three ways in order to determine the risk reduction: (1) Use the same groupings as shown in the Proposed Risk Mitigation Plan; (2) Group the mitigations by current controls or future mitigations, and similarities in potential drivers, potential consequences, assets, or dependencies (e.g., purchase of software and training on the software); or (3) Analyze the proposed mitigations as one group (i.e., to cover a range of activities associated with the risk).
2. **Identify mitigation groupings as either current controls or incremental mitigations:** The Company identified the groupings by either current controls, which refer to controls that are already in place, or incremental mitigations, which refer to significantly new or expanded mitigations.
3. **Identify a methodology to quantify the impact of each mitigation grouping:** The Company identified the most pertinent methodology to quantify the potential risk reduction resulting from a mitigation grouping’s impact by considering a spectrum of data, including empirical data to the extent available, supplemented with the knowledge and experience of subject matter experts.

³¹ D.16-08-018 Ordering Paragraph 8.

³² D.14-12-025 also refers to this as “estimated mitigation costs in relation to risk mitigation benefits.”

Sources of data included existing Company data and studies, outputs from data modeling, industry studies, and other third-party data and research.

4. **Calculate the risk reduction (change in the risk score):** Using the methodology in Step 3, the Company determined the change in the risk score by using one of the following two approaches to calculate a Potential Risk Score: (1) for current controls, a Potential Risk Score was calculated that represents the increased risk score if the current control was not in place; (2) for incremental mitigations, a Potential Risk Score was calculated that represents the new risk score if the incremental mitigation is put into place. Next, the Company calculated the risk reduction by taking the residual risk score (See Table 2 in this chapter.) and subtracting the Potential Risk Score. For current controls, the analysis assesses how much the risk might increase (i.e., what the potential risk score would be) if that control was removed.³³ For incremental mitigations, the analysis assesses the anticipated reduction of the risk if the new mitigations are implemented. The change in risk score is the risk reduction attributable to each mitigation.

6.1.2 Calculating Risk Spend Efficiency

The Company SMEs then incorporated the mitigation costs from Section 6. They multiplied the risk reduction developed in subsection 6.1.1 by the number of years of risk reduction expected to be realized by the expenditure, and divided it by the total expenditure on the mitigation (capital and O&M). The result is a ratio of risk reduction per dollar, or RSE. This number can be used to measure the relative efficiency of each proposed mitigation to another within the same risk. Figure 2 shows the RSE calculation.

Figure 2: Formula for Calculating RSE

$$\text{Risk Spend Efficiency} = \frac{\text{Risk Reduction} * \text{Number of Years of Expected Risk Reduction}}{\text{Total Mitigation Cost (in thousands)}}$$

The RSE is presented in this Report as a range, bounded by the low and high cost estimates shown in Table 4 of this chapter. The resulting RSE scores, in units of risk reduction per dollar, can be used to compare mitigations within a risk, as is shown for each risk in this Report.

6.2 Risk Spend Efficiency Applied to This Risk

SoCalGas analysts used the general approach discussed in Section 7.1, above, in order to assess the RSE for the Workforce Planning risk. The RAMP Approach chapter in this Report provides a more detailed example of the calculation used by the Company.

The risk reduction associated with the aforementioned projects was estimated using research, proprietary data and information from SoCalGas, along with input from subject-matter experts. The current controls were analyzed as one group. Incremental mitigations were analyzed as one group, also.

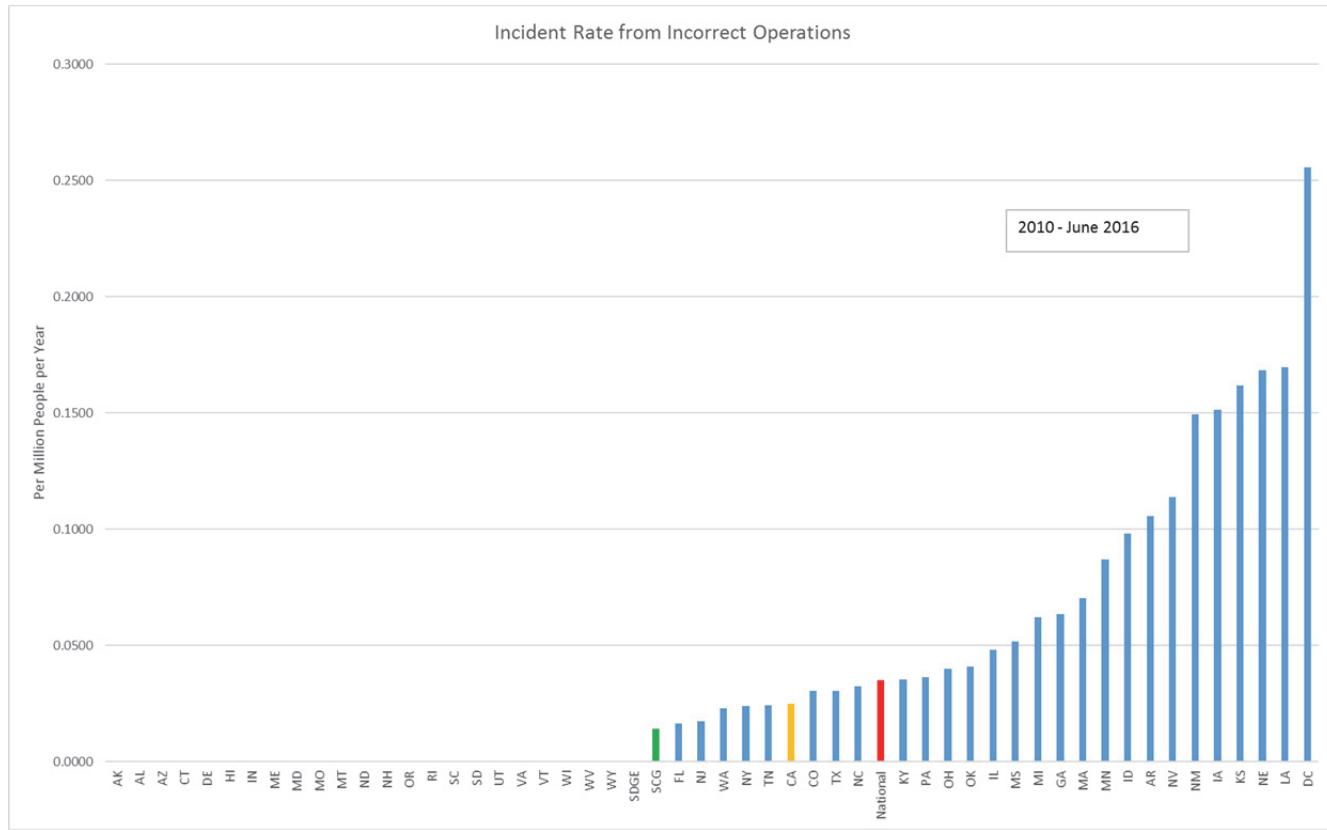
Analysis of Current Controls Grouping

³³ For purposes of this analysis, the risk event used is the reasonable worst case scenario, described in the Risk Information section of this chapter.

For estimating the risk reduction from current controls, the Federal Pipeline and Hazardous Materials Safety Administration (PHMSA) data of significant gas incidents caused by incorrect operations is considered a good indicator, or proxy. This is because incidents cause of “incorrect operations” is most closely related to employee human error.

With appropriate Workforce Planning controls in place, SoCalGas expects that safety incidents due to workforce planning would correspondingly decrease. Without current mitigations, it is assumed after one decade, the number of workforce planning-related incidents would equal those of the worst performing state as recorded in the PHMSA gas incident data. Using the worst performing state is a conservative approach because all major utilities have some type of basic workforce planning mitigations (e.g., training). Thus, the data represents minimum performance degradation expectations.

The chart below shows the gas incident rate from incorrect operations at SoCalGas compared to other states, SDG&E, and the national average for years 2010 to 2016. The current SoCalGas incident rate is 0.0142 incidents per million people per year while the worst performing state’s rate (Louisiana) is 0.1697 incidents per million people per year over the same time period.



Using SoCalGas’ service population of 21.6 million people, the incident rates can be converted to an incident expectation, given by the following calculation:

$$\begin{aligned}
 &= \text{Expected Incident Rate} = \Delta(\text{Incident Rate}) * \text{Service Population} \\
 &= (0.1697 - 0.0142) \text{ incidents per million people per year} \times 21.6 \text{ million people} = 3.358
 \end{aligned}$$

The 2015 baseline assessment is that the frequency of an incident is 0.58 incidents per year. Since a decade will not have elapsed between years 2014 and 2019, the expected incident rate is divided by 3, which yields a multiplier of $(3.358 / 058)/3$ or 1.9. Thus, the mitigated risk estimate is the residual risk times 1.9.

Analysis of Incremental Mitigations

Typically, it is anticipated that incremental mitigations will further reduce the risk from baseline levels. However, a unique aspect of this risk is that incremental mitigations are needed to help maintain the status quo. In other words, due to the changing environment and workforce characteristics (e.g., attrition), risk reduction estimates capture how incremental activities both: 1) prevent the risk from worsening; and 2) further reduce the risk below 2015 levels.

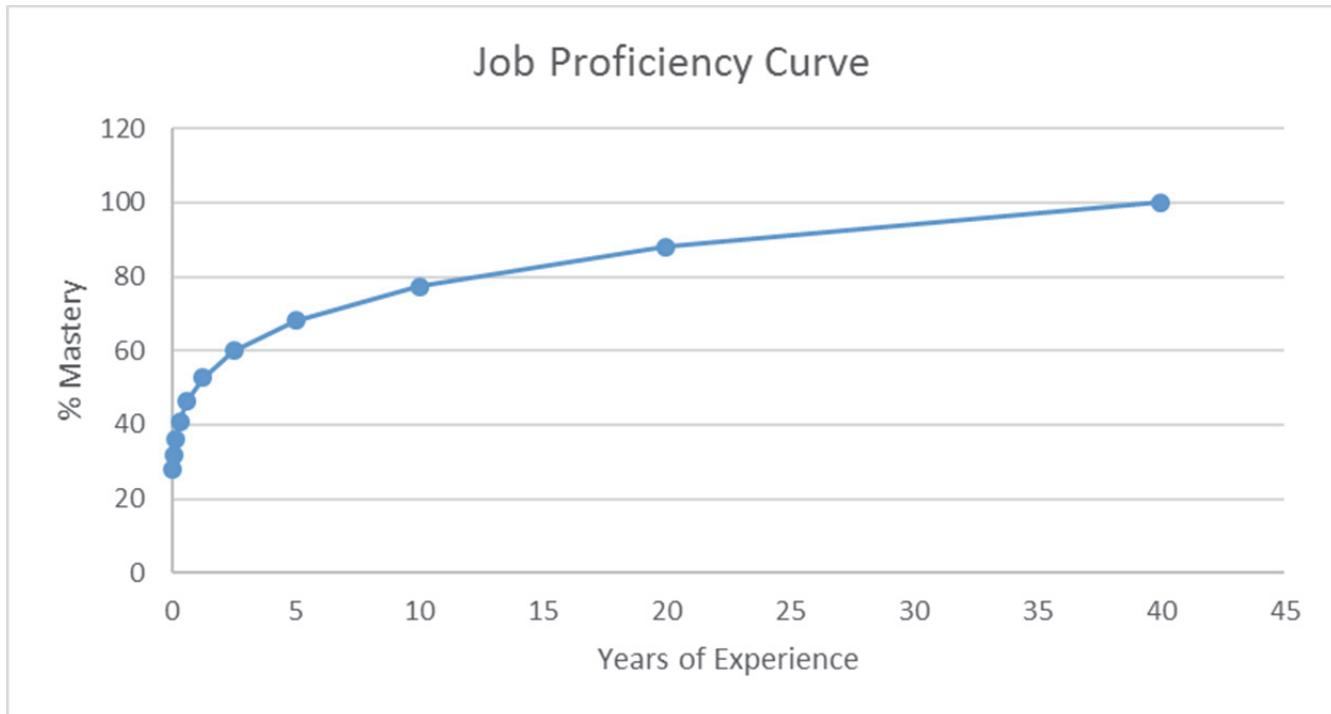
For proposed mitigations, the change in risk reduction is calculated by considering the relationship between job proficiency and the number of expected incidents. Job proficiency was assumed to correlate to years of service.

SoCalGas is experiencing employee turnover because of retirements. As indicated by a PriceWaterhouseCoopers benchmarking study, it is estimated that 58% of management, and 32% of non-management employees are eligible for retirement through the end of year 2020. As a result, the expectation is that there is going to be a temporary drop in the level of workforce job proficiency.

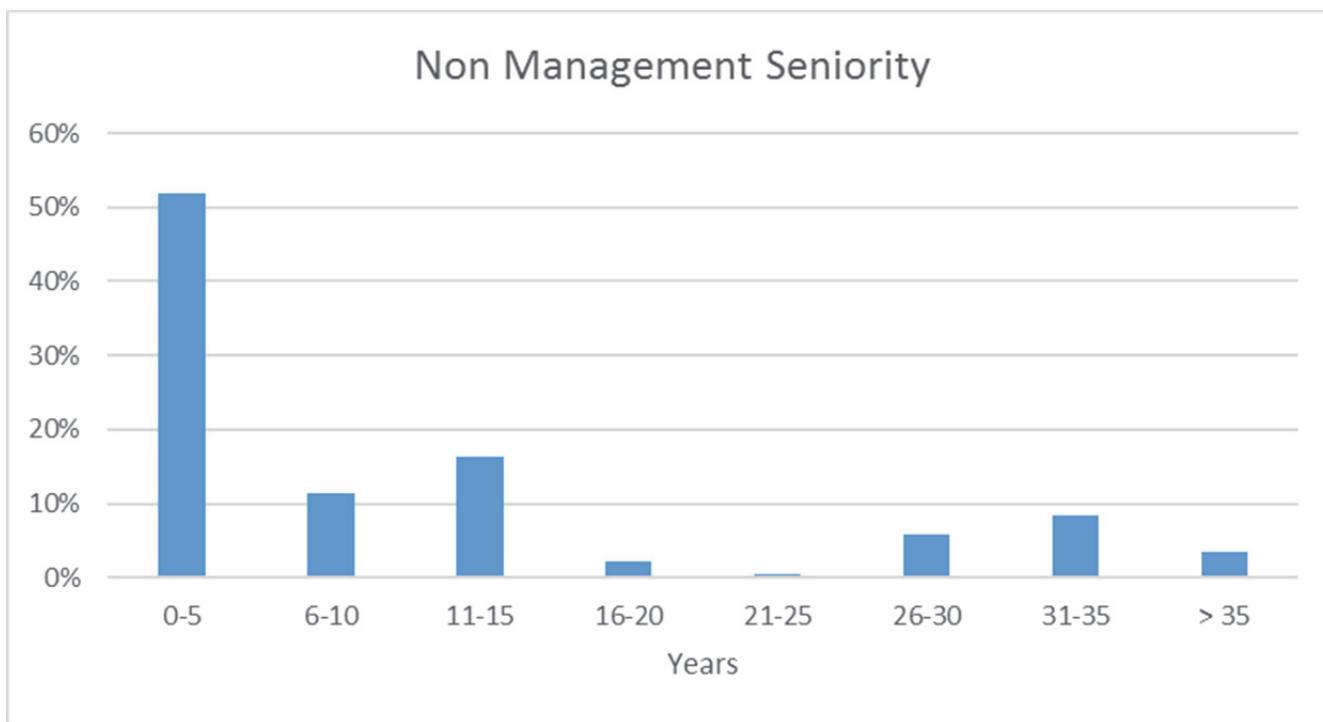
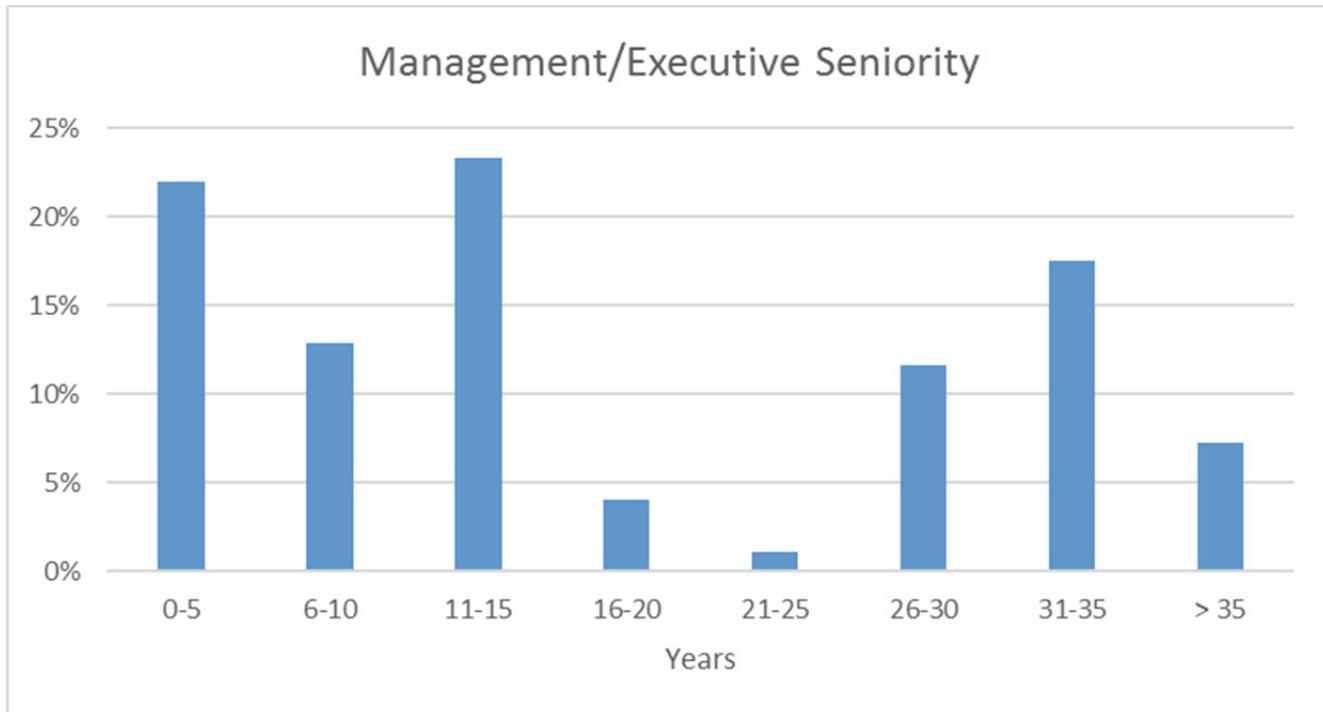
An estimate of net workforce proficiency can be used as a proxy to get the benefit of proposed measures. As a significant number of people are replaced with less experienced personnel over a short period of time, it is logical to expect workforce proficiency challenges if there were a lack of appropriate mitigations to alleviate these challenges. It is assumed that there is a direct correlation between proficiency and safety.

In order to get the benefit in terms of a percent improvement in workforce proficiency, it is important to know how proficiency evolves for technical employees as a function of experience. Based on productivity information for engineers,³⁴ the function displayed below was derived:

³⁴ Source: Jaber, Mohamad. Learning Curves Theory, Models & Applications, p. 376, 2011.



The above curve can be matched with a second curve that shows the range of work experience to get the desired net workforce proficiency. Actual work experience is not tracked for employees, but seniority is, so this will be used as a set of representative numbers. The graphs below show the current state of the workforce at SoCalGas for employees with a safety-connected job.



Merging the job seniority graphs with the proficiency curve yields the current net workforce proficiency. To derive the future state of the net workforce proficiency, the job seniority curves were modified by assuming a first in/first out pattern. The net result from these calculations is a 12% improvement.

Additionally, management estimated the incremental activities would further improve the risk by 3% for a total benefit of 15% of the residual risk.

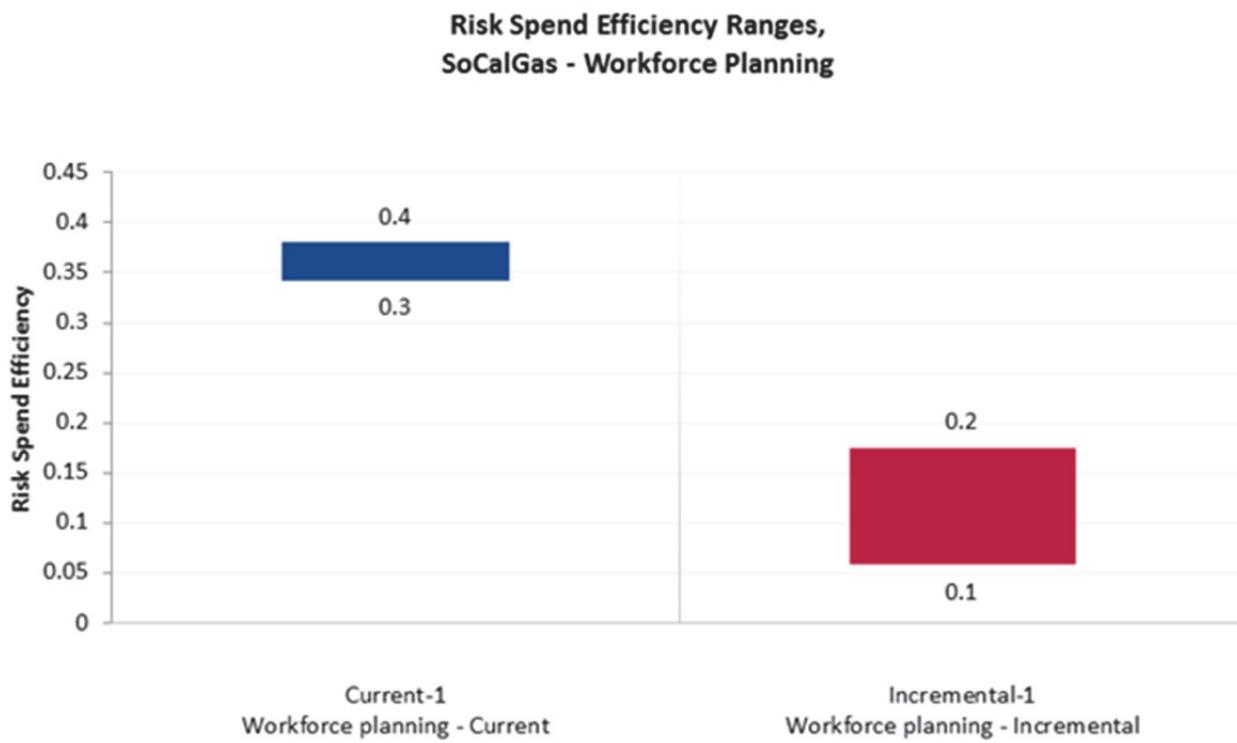
6.3 Risk Spend Efficiency Results

Based on the foregoing analysis, SoCalGas calculated the RSE ratio for each of the proposed mitigation groupings. Following is the ranking of the mitigation groupings from the highest to the lowest efficiency, as indicated by the RSE number:

1. Workforce planning (current controls)
2. Workforce planning (incremental mitigations)

Figure 3 displays the range³⁵ of RSEs for each of the SoCalGas Workforce Planning risk mitigation groupings, arrayed in descending order.³⁶ That is, the more efficient mitigations, in terms of risk reduction per spend, are on the left side of the chart.

Figure 3: Risk Spend Efficiency



³⁵ Based on the low and high cost ranges provided in Table 4 of this chapter.

³⁶ It is important to note that the risk mitigation prioritization shown in this Report, is not comparable across other risks in this Report.

7 Alternatives Analysis

SoCalGas considered various approaches to conducting workforce planning, knowledge management, and HR-sponsored training, including alternative strategies and resources (e.g., FTEs and software), as it developed the incremental mitigation plan for the Workforce Planning risk. Typically, alternatives analysis occurs when implementing activities, and with vendor selection in particular, to obtain the best result or product for the cost. The alternatives analysis for this risk plan also took into account modifications to the proposed plan and constraints, such as budget and resources. The following represents alternatives for workforce planning, knowledge management, and HR-sponsored training. The feasibility of the alternatives was considered in determining the best course of action. The viability of each alternative was determined through discussions with stakeholders. The alternatives were dismissed due to financial pressures, unique company knowledge, or lack of workforce planning data to justify the accelerated timeline, etc.

7.1 Alternative 1 – Current Workforce Planning Process

SoCalGas considered an alternative that would not implement proposed software and instead maintain the current manual workforce planning processes. This is not a feasible option because it would limit SoCalGas' workforce plans by making it static. Due to the high potential for changes, turnover, and retirements in the upcoming years, SoCalGas aims to provide workforce plans that are fluid and/or easily updatable. Real-time workforce planning data is essential in executing knowledge management, training, and succession planning activities as well; the manual process does not produce data in a timely manner nor does it have the same level of accuracy.

7.2 Alternative 2 – Changes to Knowledge Management

Another alternative SoCalGas considered was changes to knowledge management practices and tools. These changes contemplated by SoCalGas and the rationale for dismissing this alternative in favor of the proposed plan are as follows:

- Outsourcing knowledge management resources and development
 - This alternative was dismissed because the critical areas of knowledge are all SoCalGas specific and based on tenure and the understanding of how our internal processes work. External vendors or consultants may be unsuccessful in capturing the appropriate information.
- Maintaining the status quo of the succession planning process and not including the identification of critical roles for the purposes of knowledge transfer
 - This alternative would increase the risk of losing critical knowledge and gaps in creating knowledge transfer plans, especially with the number of anticipated retirements in the upcoming years.
- Expansion of Communities of Practice at a higher rate to expedite the transfer of critical knowledge
 - Detailed workforce planning data would be required to justify this alternative and the data would help determine the appropriate number of communities to launch in the future.



7.3 Alternative 3 – Accelerate Leadership Training Sessions

With respect to training, SoCalGas considered offering an increased number of leadership training sessions to expedite increasing leaders' skills. This would improve safety by verifying that company leaders are prepared and educated on how to do their job. Increased leadership training would also emphasize safety in the company culture and set the tone at the top of management that safety is a high priority. This alternative was dismissed because it would require detailed workforce planning data to justify this alternative and to specify which trainings to focus on. SoCalGas' proposed plan includes enhancements to workforce planning data through implementation of new technology and an analysis of critical roles and trainings. SoCalGas will reconsider this alternative once the proposed plan is in place.