

**SED DATA REQUEST - 2**  
**SDG&E-SOCALGAS RAMP - I.16-10-015\_016**  
**SDG&E& SOCALGAS RESPONSE**  
**DATE RECEIVED: JANUARY 12, 2017**  
**DATE RESPONDED: JANUARY 20, 2017**

**Risk Chapter SCG-2 Employee, Contractor, Customer, and Public Safety**

*Current 2015 Controls that Address Occupational Incidents*

1. What are the average spending changes year-over-year (broken down into Capex and O&M) since 2007 that correspond to the 2.6% average improvement in incident rate seen since 2007? [We are trying to understand the incremental spending that took place that may correlate with the incremental y-o-y improvement in rates. It would appear that many factors other than spending in this category drive the improvement (reduction) in incident rates, but since SCG uses incident rates as a proxy to justify spending increases then there should be a direct and measurable correlation.

**Response 01:**

Costs were developed on a project and program or mitigation basis; costs were not developed specific to occupational incidents. Occupational incidents were a metric utilized for this risk to quantify risk reduction. As shown on page SCG 2-42 of the RAMP Report, risk reduction represents the numerator of the Risk Spend Efficiency (RSE) calculation. The 2.6% improvement rate was one factor used to determine the risk reduction, i.e. the numerator. Many drivers account for the 2.6% improvement in the OSHA rate. At this point, isolation or mapping of specific mitigations and the extent to which they relate to the OSHA improvement rate have not been done. Moreover, all the mitigations are expected to impact the OSHA incident rate to varying degrees so such isolation or mapping may be challenging to perform.

Costs are used in the denominator of the RSE calculation. The costs related to occupational incidents for purposes of the RSE were allocated based on a proxy ratio of non-CMVI related incidents to total incidents. This ratio was developed using subject matter expertise.

As shown in the RAMP cost workpapers, SoCalGas reviewed historical costs for its mitigations dating back to 2011 (again, it is important to note that mitigations were not specifically mapped to the occupational incidents rate; rather the rate was a metric leveraged to calculate the RSE). Pulling historical accounting or cost information “was a challenge because the utilities do not have accounting data available in that manner. Consequently, the utilities first needed to identify all the projects and programs in place to mitigate the RAMP safety risks, determine where the activity was booked and then pull the applicable accounting data.”<sup>1</sup> To the extent accounting information was not available, high-level assumptions based on subject matter expert judgment were used. The cost gathering efforts for the RAMP took a considerable amount of time. Therefore, further gathering of cost information back to 2007 is not feasible at this point in time.

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<sup>1</sup> RAMP Report, Chapters F Lessons Learned, at p. SDGE/SCG F-2.

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*Current 2015 Controls that Address Occupational Incidents*

2. How did SCG determine that OSHA reportable incidents would reach the worst state in three years? [In other chapters (SCG-7) SCG uses a decade as the period of time that incident rates would degrade to the worst-case scenario. We are trying to understand whether the different time spans for degradation is objective or subjective, and what may influence the choice for shorter versus longer period. It would seem that a situation that degrades faster must need constant reinforcement of the driving behavior or practices to ensure that employee's performance doesn't start slipping.]

**Response 02:**

The degradation factors applied to the datasets across SCG chapters were developed based on different subject matter expertise. It is important to note that:

- The two risks in SCG-2 versus SCG-7 are different and thus, the datasets used for the two assessments were different. The data used for SCG-7 is Pipeline & Hazardous Materials Safety Administration (PHMSA) incident rates due to incorrect operations whereas the data used for SCG-2 is Occupational Safety & Health Administration (OSHA) incident rates due to employee injuries and Controllable Motor Vehicle Incident (CMVI) rates based on American Gas Association (AGA) data.
- The starting point for the degradation estimate is different. The SCG-7 degradation estimate is from 'better-than-average' performance to 'worst-in-class,' and is expected to take longer than moving from 'less-than-average' to 'worst-in-class' performance, the range of degradation in the SCG-2 assessment.
- The two assessments use two different concepts – SCG-2 is one that entails the short-term loss of safety-specific training knowledge (that occurs more frequently and requires more frequent reinforcement of safety principles); and SCG-7 is one that is related to the long-term risk of not having a workforce with the right skills and/or experience due to attrition and changing business needs.
- Since OSHA incidents are often triggered by unsafe behaviors/actions (i.e., not following policy), the company focuses on constant training and reinforcement of safety policies/principles. Moreover, workforce changes (i.e., employee movement and attrition) have been accelerating. Combined with the continual adoption of new technologies, Subject Matter Experts (SMEs) for SCG-2 assumed the degradation of SoCalGas' safety culture could occur at a much faster rate than the decades required to build it.
- The benefits analysis is conservative since the calculation considers the elimination of all safety-related mitigations identified, listed in the chapter. This elimination was assumed to lead SoCalGas' reportable incident rate to degrade to the OSHA rate of the worst performing utility; however, even this utility would still have some basic controls in place.

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*Incremental Mitigations that Address Occupational Incidents*

*SoCalGas has seen a 3-year average improvement rate of 2.6% since 2007 and is anticipating an increase in that improvement rate based on incremental mitigations SoCalGas is proposing to implement. The impact of incremental activities was based on SME input with an estimated increase of 50% in the rate of improvement. The estimated potential reduction in risk frequency is approximately 4%.*

1. What time frame does the SME use to achieve the 50% increase in the rate of improvement? (Clarify whether that means the rate of improvement will become 3.9% and what time frame that will be achieved.)

**Response 01:**

The RSE calculation did not include a time interval for the rate of improvement with the proposed incremental funding. The benefit calculation suggests the OSHA rate would improve by 50% from the historical trend of 2.6% to 3.9%. This assumes the proposed mitigations are fully implemented. However, a specific project plan and timeline has not been fully delineated, since the formal request for funding and project timing will be included in the Test Year 2019 General Rate Case (GRC) Application. Nonetheless, if funding were authorized for the incremental activities, the benefits are anticipated to be realized once the mitigation is fully implemented. Please note that the RSE was developed using SME judgment and empirical data to the extent it was available. However, it is possible the rate of improvement could be more or less depending on various factors such as: changes in workforce, changes in technology, ease of implementation, ease of adoption, and other unknown factors.

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*Current Controls that Address Motor Vehicle Incidents*

1. In SCG-7 it was assumed that the worst case state would be reached in a decade. How did SCG decide to use a 3-year span to reach worst case for this RSE?

**Response 01:**

See response to Question 2 above in the section *Current 2015 Controls that Address Occupational Incidents*.

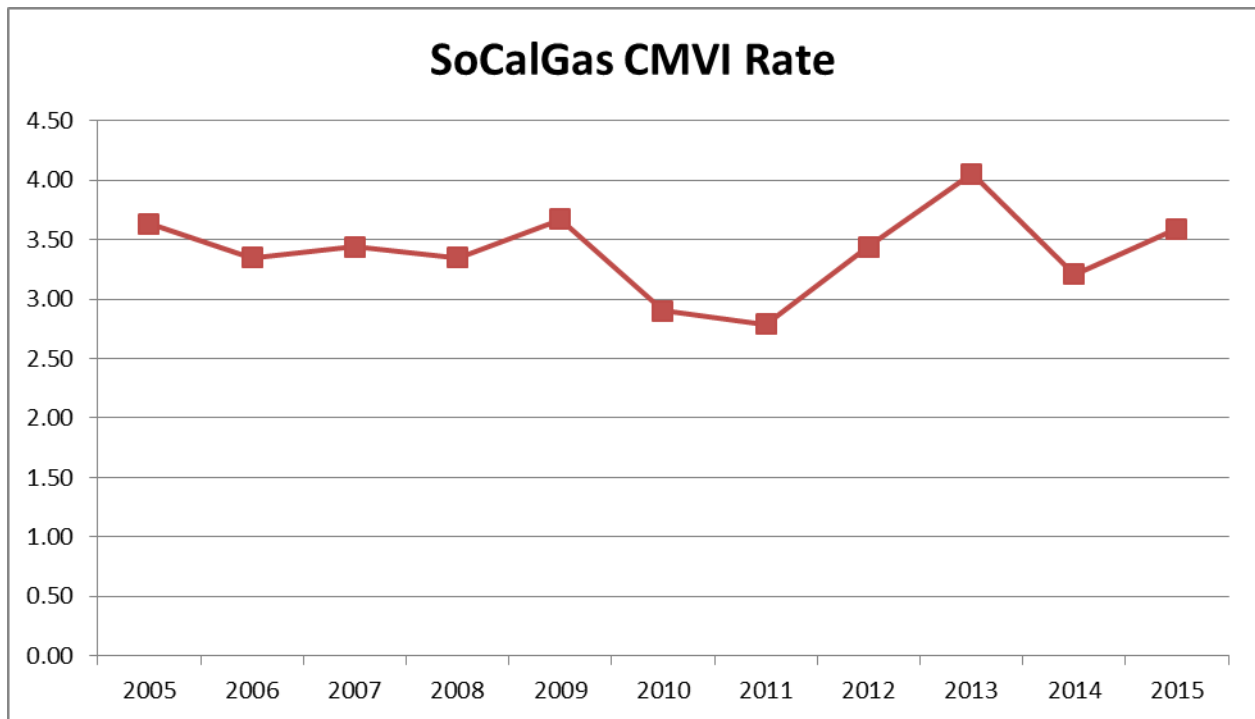
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*Current Controls that Address Motor Vehicle Incidents*

2. Provide a table of the yearly increases in spending year-over-year in these cost centers that correspond to the current level of mitigations/programs from 2005 to 2015. Include a comparison to the yearly changes in SCG's CMVI rate since 2005 both up and down.

**Response 02:**

See the graph below showing the yearly changes in CMVI rates for the period 2005 to 2015. CMVI specific mitigations/cost centers were not identified. Instead, this chapter attempted to capture all mitigations impacting employee, customer, contractor, and public safety and allocate those dollars based on a proxy ratio of CMVI-related incidents to total incidents. Due to the way costs are tracked, which has not been by risk mitigations, it took a considerable amount of time to gather historical costs for various mitigations. Please refer to the response to Question 1 above in the section *Current 2015 Controls that Address Occupational Incidents*.



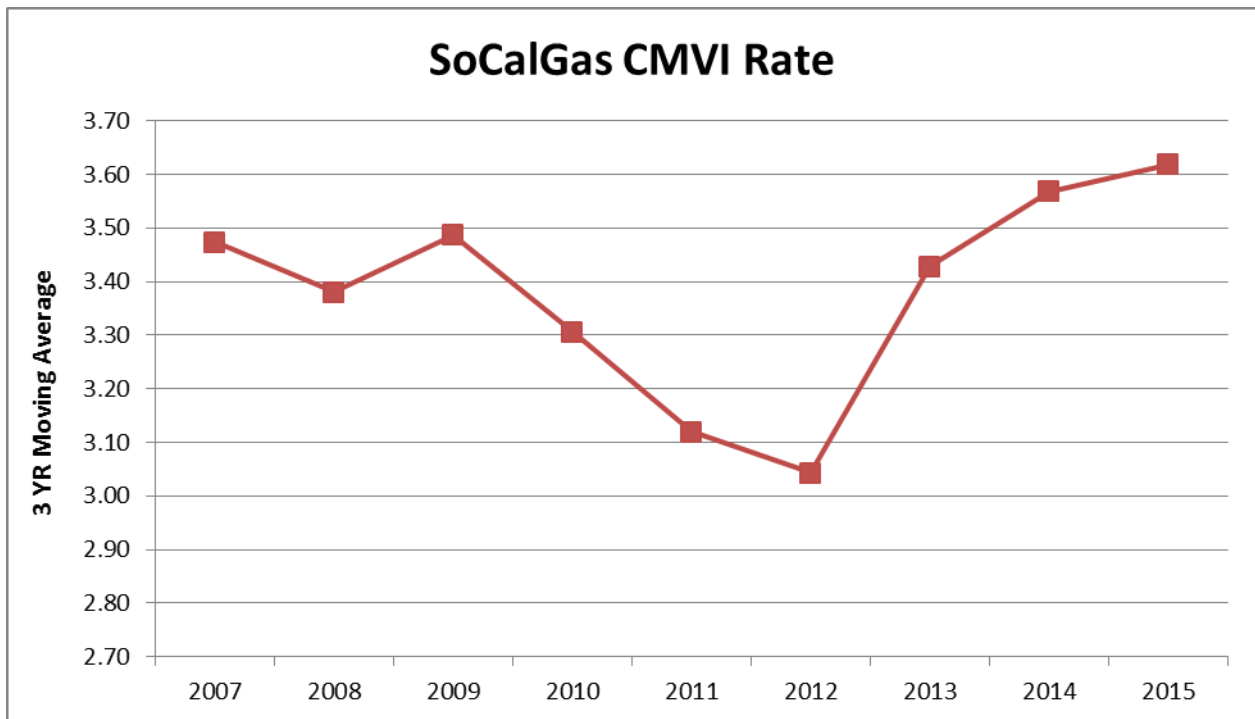
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*Current Controls that Address Motor Vehicle Incidents*

3. What is the 3 year trailing average SCG CMVI rate since 2007 (please graph the CMVI rate of change and juxtaposed against the rate of change in spending in these cost centers.)?

**Response 03:**

See the graph below showing the 3 year trailing average changes in CMVI rates for the period 2007 to 2015. Please refer to the response to Question 2 above in this section.



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*Incremental Mitigations that Address Motor Vehicle Incidents*

1. What empirical evidence exists to suggest that proposed changes will decrease Controllable Motor Vehicle Incidents by 5%?

**Response 01:**

SoCalGas' SMEs used their judgment coupled with anecdotal evidence of the benefit of various proposed incremental mitigations. For example, a portion of SoCalGas' proposed incremental spend is for the installation of telematics. In 2014, the Federal Motor Carrier Safety Administration (FMCSA) evaluated the safety benefits of a telematics system through reduction in unsafe behaviors, such as sudden acceleration, hard braking, and sudden lane changes. The study showed that telematics can reduce unsafe behaviors (not vehicle incidents) by up to approximately 50% with the activation of in-cab alerts, driver rating and coaching, and performance-based incentives. This in turn can result in potential reductions in motor vehicle incidents. On the other hand, SoCalGas' historical trend shows that it has been very difficult to achieve a sustainable reduction in the CMVI incident rate over a long period of time. Given that the trend is essentially flat and this is the company's first RAMP Report, the SMEs used this type of information as anecdotal evidence, but did not perform a quantitative assessment of the exact risk reduction that would be achieved by the telematics system and other proposed mitigations.

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*Incremental Mitigations that Address Motor Vehicle Incidents*

2. Over what time frame will the 5% decrease be achieved?

**Response 02:**

The RSE calculation did not include a time interval for the rate of improvement with the proposed incremental funding. Various mitigations are at different stages in the project plan (some pilots, some in initial assessment, etc.). Please refer to the response to Question 1 above in the section *Incremental Mitigations that Address Occupational Incidents*.



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***8.2 Alternative 2 – Modernizing Training Techniques***

1. What empirical evidence has SoCalGas considered and relied on to evaluate the efficacy of modernizing its safety training techniques to include more videos, computer simulations, and computer-based training delivery channels?

**Response 01:**

SoCalGas relied upon the experience and judgment of its SMEs to evaluate the potential benefits of modernizing its safety training program. Safety training continues to be a key control to help employees understand and mitigate safety hazards encountered in the work environment. SoCalGas' existing training program for field employees heavily relies upon hands-on training in a classroom setting or at a job-site delivered by experienced in-house trainers. More effective videos and refreshed content is being considered on an ongoing basis. Nonetheless, SoCalGas believes safety principles associated with job activities (e.g., field-related training) are best reinforced through live training. Where it makes sense, safety training for office employees has been gradually converted to computer-based delivery channels, such as the training on Injury & Illness Prevention Program, Emergency Action & Fire Prevention Plan, and Smith Defensive Driving refresher training. However, SoCalGas' proposed mitigation plan to further improve hands-on training is expected to gain more benefits than investing in computer-based, stand-alone or self-teaching training alternatives. For example, as noted in the RAMP Report at page SCG 2-25 for the proposed mitigation to expand initial Smith System Defensive Driving training, a pilot study performed in the Meter Reading department in 2014 and 2015 yielded an average reduction in CMVI rates of approximately 20% per year (from 5.69 CMVIs per million miles driven in 2013 to 3.43 CMVIs per million miles driven at year-end 2015).

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***8.3 Alternative 3 – Updating to Technologically Advanced Fleet***

1. What empirical studies or evidence did SoCalGas considered or rely on when it evaluated the approach that requires replacing its current vehicle fleet with vehicles equipped with the latest safety technology (vehicle guidance, blind spot assist, attention assist, etc.) versus the risk-reduction alternatives that involve behavior modification and reinforcement?

**Response 01:**

While engineering enhancements can help supplement feedback to the drivers, SoCalGas is concerned that they can also provide employees with false comfort/confidence/reliance on these features if not reinforced with behavioral mitigations. SoCalGas' historical CMVI incidents show that, even with back-up sensors outfitted in fleet vehicles, roughly half of the incidents involve employees hitting stationary objects backing into or moving forward at slow speeds while arriving at or leaving their destinations. Safety technology features will likely play an increasingly important role as new technologies evolve and are integrated into vehicles as optional or standard features. Other than backup sensors and backup cameras, these advanced safety technologies are not currently available for fleet vehicles. Instead, SoCalGas employees are taught that there is no substitute for personal attention, focus, and the use of safe driving behaviors, which means technologies are meant to assist employees to drive safely, but not be solely relied upon.

SoCalGas will continue to introduce new safety technologies as appropriate and when readily available as part of the normal fleet turnover, by first conducting pilot studies (e.g., telematics) when feasible, and as a cost-effective approach to fleet management.

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***8.3 Alternative 3 – Updating to Technologically Advanced Fleet***

2. Rather than a wholesale fleet replacement, was a multi-year phased deployment of vehicle safety technology as a part of the normal vehicle fleet turnover considered as a method for introducing the latest safety technology? What kind of evaluation was performed on whether vehicles deployed with safety technology would aid in the reinforcement and monitoring of behavior?

**Response 02:**

See the response to Question 1 above in this section ***Alternative 3 – Updating to Technologically Advanced Fleet.***

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**Risk Chapter SCG-4, High-Pressure Pipeline Failures.**

It appears some data is missing that if provided will lend clarity to the RAMP report.

1. Please estimate the incremental risk reduction that you expect from the projected increase, and then provide the RSE.

**Response 01:**

We expect that the RSE related to projected increase will remain nearly the same, with a small benefit reduction since the system integrity is improving as work and related spending continues (e.g., portions of the infrastructure deemed of highest risk are mitigated first, followed by those that are less apt to fail, and so on).

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2. Please provide a list of the pipeline failure incidents from 2010 to 2016, by cause, that were used to derive the figure of 0.051 incidents per one million service population that is referenced on page SCG 4-25.

**Response 02:**

Seven (7) incidents reported between 2010 and 2016 were used to derive the figure of 0.051 incidents per one million service population referenced on page SCG 4-25. This transmission pipeline incident data is from PHMSA. The dates and causes of the incidents are:

12/17/2014	EXCAVATION DAMAGE
11/14/2014	INCORRECT OPERATION
8/15/2014	EXCAVATION DAMAGE
6/7/2013	EXCAVATION DAMAGE
2/4/2013	INCORRECT OPERATION
8/5/2011	EXCAVATION DAMAGE
9/2/2010	EXCAVATION DAMAGE

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3. Please provide details for the determination of residual risk multipliers for the categories of PSEP, Technical Training, and Regulatory Compliance Activities; specifically provide the derivation of the corresponding risk reduction values 4.2, 3.0 and 48.6 as presented on Page SCG 4-26.

**Response 03:**

The mathematical formula is as follows:

Expected number of incidents per year =  $(A - B) \times C$ , where:

A = worst state incident rate, incidents per million people per year,

B = company incident rate, incidents per million people per year,

C = population in service territory footprint, in millions of people.

For example, using the data provided in the supporting analysis documents for one of the calculations, the calculation is as follows:

Expected Incidents per Year =  $(0.152 - 0.015)$  incidents per million customers per year \*  
21.6 million customers = 3.0 incidents per year.

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**Risk Chapters SCG-7 Workforce Planning**

There were several assumptions used to explain the risk profile and mitigation programs proposed. Does SCG have any empirical evidence to support the assumptions used? For example:

Job proficiency was assumed to correlate to years of service. It is not clear there is a strong causal relationship between years of service and proficiency.

- What studies does SCG have to support this assumption? What is the basis for this curve?

**Response:** The study SoCalGas used to support this assumption is engineering productivity research published in Learning Curves Theory, Models & Applications, by Jaber, Mohamad at p. 376. The basis for the curve is empirical data the researchers collected on the effects of accumulated experience as workers did engineering tasks. SoCalGas assumed that this data could be applied to other technical roles.

- Please explain the perimeters around the assumption, such as whether your graph assumes once hired the employee works for 40 years, or whether employees with prior skills and experience are recognized in the chart.

**Response:** The underlying assumptions of the graph are: (a) the employee is assumed to have a 40-year career; and (b) the career does not necessarily have to be with the same company; and (c) the career is assumed to be spent in the same or related line of work.

- What other key factors drive proficiency (e.g. training, quality of supervision, education, aptitude, etc.)?

**Response:** The accumulated experience research used by SoCalGas focused on decision-making and the ability to deliver better, faster, and more complex results. These were the key factors considered. Another factor is training, which is one of the fundamental mitigations proposed in the Workforce Planning risk. Training will help close any existing gaps, increase proficiency levels, especially in critical areas. Also, workforce planning efforts (including software implementation) will help identify and plan for areas where there will be gaps and areas where SoCalGas will need more training.

- What metrics does SCG use to measure proficiency now? How does SCG correlate years of service to its measured proficiency metrics?

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**Risk Chapters SCG-7 Workforce Planning-Continued**

**Response:** SoCalGas currently measures proficiency using performance reviews. Currently, SoCalGas does not correlate years of service with the performance reviews.



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**Risk Chapters SCG-7 Workforce Planning-Continued**

It is unclear how “merging the job seniority graphs with the proficiency curve yields the current net workforce proficiency”. It appears the Non-Management Seniority graph just breaks down the employee population by number of years of service. The same could be said for the Management/Executive Seniority graph, however, leadership skills could be considered differently than task proficiency skills. It is unclear how these two graphs should be used since they represent distinctly different skill sets.

- Does SCG have any empirical data that can show actual worker proficiency with years of experience?

**Response:** SoCalGas relies upon qualitative data from performance appraisals for data on worker proficiency. As for the empirical relationship between worker proficiency and years of experience, SoCalGas relies on external research, such as the data on the proficiency curve described in the previous response.

- Should we assume that an employee with less than 5 years of experience is doing the same job as an employee with 11-15 years of experience?

**Response:** Although SoCalGas’ career progressions are designed to account for years of experience when promoting to the next level, there are cases where a person with 5 years of experience might be doing the same job as an employee with 11-15 years of experience. With SoCalGas’ projected rate of retirement, it is quite possible to have people with less experience doing the same job as more seasoned employees.

- Would it be reasonable to assume that employees are performing jobs of increasing complexity based on their proficiency level, and that an entry level employee may be very proficient at an entry level job? If so, how does that fit into the proficiency curve?

**Response:** The proficiency curve and the achieved proficiency in a particular job category are different concepts. Generally, in each job classification, an employee tends to rapidly gain proficiency, especially with repetitive tasks, and then master the nuances over a longer period of time. The proficiency curve is intended to reflect mastery of all aspects in a line of work, and thus reflects different levels of responsibilities and requirements over a technical career.

- What level of proficiency does SCG consider the minimum acceptable?

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**Risk Chapters SCG-7 Workforce Planning-Continued**

**Response:** The level of proficiency needed (including standards, company guidelines, and other requirements) to enter a job is specific to that particular position and is listed in the job description. Subsequently, maintaining an acceptable level of proficiency is addressed by performance reviews.

- What level of proficiency does SCG consider the minimum acceptable to maintain the currently level of PHMSA incident rate at 0.0142 incidents per million people per year?

**Response:** For worker proficiency, SoCalGas assumes it would need to be at the 2015 baseline rate in order to maintain the current PHMSA incident rate for significant gas incidents (related to incorrect operations).

- How many current employees do not meet the minimum acceptable proficiency level?

**Response:** Employees who do not meet a minimum acceptable proficiency level for a particular position are counseled through the performance management process and are either moved into a different job or exit the organization.

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**Risk Chapters SCG-7 Workforce Planning-Continued**

“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.”

- Why does SCG think that the incident rate would degrade to 01.1697 in a decade and not sooner?

**Response:** The effects of training and on-the-job experience do not fade immediately. It will take time for a significant portion of the workforce, who possess this training and experience, to retire or leave the company.

- It appears that SCG makes a correlation to the spending levels and safety incident rates. Please explain the rationale for this.
  - If it was assumed that Louisiana utilities were spending a ratably equivalent amount and had different mitigation programs, then wouldn't that speak to other factors than the amount of money spent on workforce planning that impacted safety incidents?
  - If SCG is spending roughly equivalent amounts as Louisiana utilities, then how does using the comparison support the need to spend more money when SCG is already 10 times better than Louisiana utilities?

**Response:** All gas utilities spend money on safety-related activities. If workforce management and employee training activities were to be eliminated, safety performance is expected to deteriorate. Staying within the bounds of the chart reflective of incidents connected to human error is a conservative way of estimating the level of expected deterioration because, “at best,” SoCalGas would be at the level of the poor performers. A gas utility that neglects all of the mentioned activities would have a significantly worse safety record (potentially off the chart of historical performance) than the historical performance presented.

- Isn't there a rebuttable presumption that spending the same amount in the future, all things being equal, that same results will be achieved over time? SCG has absorbed over 50% of its current non-managerial workforce in the last 5 years and maintained an incident rate of 0.0142 over the same time period. Given that the employees with over 25-years of experience are more likely to retire over the next 5 years, and this sub-population makes up less than 20% of the non-management workforce wouldn't it be reasonable to assume that SCG would be able to absorb replacement of these workers over the next 5 years based on its ability to absorb the increase of 50% over the last five years?

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**Risk Chapters SCG-7 Workforce Planning-Continued**

**Response:** There is no such rebuttable presumption. SoCalGas assumed that all things will not be equal due to a high likelihood of increasing retirements and turnover, which is why it is presumed that additional training will be needed to close those gaps. The percentage of employees who are highly experienced is expected to greatly decrease, thus decreasing the benefits attained from the highly proficient workforce. There is no basis for SoCalGas to believe it is reasonable to assume the ability to absorb an increase of non-managerial workforce in general has any correlation with absorbing replacement of highly experienced workers.

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**Risk Chapters SCG-10 (Medium Pressure Failures) and SDG&E-2 (Dig-Ins)**

These RAMP chapters discuss use of a “true-up” factor of 6x or 1/6x to allow comparison of RSE’s between SDG&E and SCG.

Why did SEMPRA choose to calculate comparable RSE’s for these chapters, when the overall discussion of the RAMP states that comparison between chapters was not intended?

**Response:**

While comparison between chapters (or risks) is not intended, in this case the risk is the same between SDG&E and SoCalGas, the corresponding mitigations are mostly identical, and the monitoring of the risk and the mitigations are generally supported under common groups, policies, and practices. Therefore, in these two cases it was feasible to roughly compare the mitigations between the utilities, using a “true-up” factor based on the ratio of pipe mileage.