

BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA



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Order Instituting Investigation Into the  
November 2016 Submission of San Diego  
Gas & Electric Company's Risk Assessment  
and Mitigation Phase.

Investigation 16-10-015  
(Filed October 27, 2016)

And Related Matter.

Investigation 16-10-016

**COMMENTS OF THE OFFICE OF RATEPAYER ADVOCATES  
ON NOVEMBER 2016 SUBMISSION OF SOUTHERN CALIFORNIA GAS COMPANY  
AND SAN DIEGO GAS & ELECTRIC COMPANY'S  
RISK ASSESSMENT AND MITIGATION PHASE**

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## **I. INTRODUCTION**

Pursuant to Rule 14.3 of the Rules of Practice and Procedure of the California Public Utilities Commission (Commission), the Office of Ratepayer Advocates (ORA) submits these comments on the November 2016 submission of Southern California Gas (SoCalGas or SCG) and San Diego Gas & Electric's (SDG&E) (collectively the "Sempra Utilities") Risk Assessment and Mitigation Phase (RAMP) filing, Investigation (I.) 16-10-015 and I.16-10-016.

## **II. SUMMARY**

In general, the Sempra Utilities' RAMP filings, which were submitted in advance of their General Rate Case (GRC) applications to be filed later in 2017, meet the requirements outlined in Decision (D.) 16-08-018. ORA agrees with the Commission's Safety and Enforcement Division (SED) that "[a]lthough some gaps remain, ... this is an evolving process."<sup>1</sup> While ORA offers many suggestions and critiques below, ORA acknowledges that the RAMP (and similarly, the Safety Model Assessment Proceeding or "S-MAP") process is one of ongoing development and learning for all parties that will likely take multiple iterations to reach a common and agreed-upon level of understanding and usefulness in a form that the Commission and parties desire. ORA recognizes and appreciates the effort the Sempra Utilities undertook to present this first-ever RAMP submission and finds the filings a good starting point upon which the Commission and other Investor-Owned Utilities (IOUs) can expand in future RAMPs.

ORA's comments are organized as follows:

- 1) Section III provides ORA's general comments on themes, concerns, or topics not specific to any of the 28 specific risks provided by the Sempra Utilities;
- 2) Sections IV and V contain ORA's comments on specific aspects of individual risks. Appendix A provides ORA's summary table of each risk's score and ranking; and
- 3) Section VI discusses ORA's recommendations for future RAMP filings.

ORA provides comments on most, but not all, risks presented by the Sempra Utilities in their RAMP filings. In keeping with the understanding that the RAMP is an evolving process, and that this RAMP is the first of its kind for the Sempra Utilities,<sup>2</sup> ORA's evaluation is not

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<sup>1</sup> SED report, p. 3.

<sup>2</sup> Pacific Gas and Electric Company (PG&E) has undergone a RAMP-like process in its prior Gas Transmission and Storage proceeding and most recent GRC.

intended to be a comprehensive review of all aspects of all risks. Therefore, comments or lack thereof should not be interpreted to be a definitive and/or comprehensive position on a specific risk or risk category.

In future RAMP filings, ORA recommends that alternative mitigations be assessed with Risk-Spend Efficiency Scores, similar to how the proposed mitigations are assessed. Changes to reported risks should be outlined in the filing, and risk data should cover a longer timeframe than the most recent year (for example, the most recent three years). Future RAMP filings should have a standardized proposed mitigation format insofar as possible to help determine which mitigations are baselines, proposed, and alternatives.

### **III. GENERAL COMMENTS**

#### **A. Availability and Use of Quantitative Data**

As noted in Section II above, ORA acknowledges the preliminary nature of this RAMP filing and that the desired data is not available in many cases. However, the Sempra Utilities' workpapers do not provide sufficient quantitative information nor do they provide sufficient explanation of their analysis. Generally speaking, the workpapers provide source information and some quantification of the metrics discussed in the narrative chapters, but almost no explanation of why certain metrics were chosen; no indication of which inputs are based on Subject Matter Expert (SME) judgement, no comparison data, nor a standardized format. Many of the risk measurements or mitigation proposals may appear quantitative at first, but the underlying logic or explanations are simply not available or stem from SME judgement. The Sempra Utilities (and other utilities) should make efforts to move away from subjective judgment and move towards clear, quantitative and probabilistic methodologies of measuring risk and risk reduction.<sup>3</sup>

ORA's concern regarding the lack of sufficient quantitative information in the Sempra Utilities' showing extends to calculations of Risk-Spend Efficiency (RSE) values. The only calculation that is consistently explained in the RAMP filing is the calculation for the "Current

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<sup>3</sup> ORA understands the role of SMEs in determining risk levels and approaches. However, as identified in American Society of Mechanical Engineers (ASME) B31.8S-2004 (Managing System Integrity of Gas Pipelines), Section 5.5 (Risk Assessment Approaches), page 12, subject matter experts are the first of four options that are "listed in a hierarchy of increasing complexity, sophistication, and data requirements." Where possible, subject matter expertise should be replaced with relative assessment models, scenario-based models, or probabilistic models. At a minimum the data sources should be clearly identified so that the Commission and parties understand the underlying data source(s).

Risk.”<sup>4</sup> The filing clearly explains the four categories of incident impact (Safety/Environmental, Reliability, Financial, Regulatory/Compliance) and the meaning behind the 1-7 ranking assigned to each category for each risk topic, as well as how those values are manipulated to calculate a final risk score. However, in only two chapters of SDG&E’s RAMP filing (SDG&E-10 and SDG&E-16) does SDG&E provide mathematical formulas and values that explain how risk reduction was calculated for different mitigations.<sup>5</sup> Even those exercises give a “residual risk modifier” and do not explain how that modifier then affects the RSE.<sup>6</sup> The filing does not illustrate how the proposed mitigations for each risk affect the risk score in a direct manner. Using only the RAMP filing, the only way to perform a calculation of Risk Reduction for a particular mitigation is to reverse-engineer the value using the RSE presented at the end of each chapter and multiplying the RSE by the costs of the mitigations. An essential component of developing transparency when it comes to evaluating risk is the ability to understand the quantitative process by which mitigations are evaluated.

In their filings, the Sempra Utilities use a different model or comparison for nearly every risk. For example, Workforce Planning effectiveness is measured in incidents relative to nationwide values (as is Workplace Violence), but Climate Change Adaptation has no comparison and Cybersecurity is measured against adherence to a National Institute of Standards and Technology (NIST) framework. ORA agrees that risks should be assessed in appropriate ways, and that these ways will likely differ. However, it is not clear that any overarching framework is being used that would make risks comparable, beyond assigning a risk score that is largely based on SME judgment. The issue of comparability across risks is under consideration in the S-MAP proceeding, Application (A.) 15-05-002 et al.

## **B. Workpaper Format and Availability**

While the Sempra Utilities provided calculations in a series of workpapers in response to a data request by the Coalition of California Utility Employees (CUE),<sup>7</sup> ORA recommends that those spreadsheets be included either as part of the RAMP filing or in an associated appendix at

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<sup>4</sup> “Current Risk” is the number that is calculated based on the safety, reliability, financial, regulatory, and frequency scores.

<sup>5</sup> See SDGE 16-22 to SDGE 16-23.

<sup>6</sup> See SDGE 10-22 to SDGE 10-23.

<sup>7</sup> CUE DR-01, Q1, Attachments (all).



the time (or shortly after) the RAMP materials are provided by the utilities. ORA also recommends that the workpapers follow a standard format as well as an explanation or “key” for any quantitative workpapers. Some columns used in calculations were hidden and could not initially be unlocked without a password, which makes checking formulas and assumptions impossible. Large portions of workpapers were also blank and it is not clear whether information was deleted, redacted or unavailable, or whether data simply didn’t belong in these descriptive-only areas.<sup>8</sup> ORA also suggests that the data input source (e.g. SME, quantitative, probabilistic, etc.) be identified within the workpapers. While ORA eventually gained full access to the workpaper files, ORA recommends that in future RAMP filings the utility workpapers should allow full-access to all spreadsheet columns and rows. This would expedite review and help address any questions or concerns early in the proceeding.

### **C. Overlap Between Risks and Risk Drivers**

At times, it was difficult to separate risks from drivers and vice versa in the Sempra Utilities’ filings. For example, ‘wildfire’ is itself a risk,<sup>2</sup> but is also listed as a contributing factor under ‘Climate Change Adaptation. In its filing, SDG&E states that the Employee, Contractor, and Public Safety risk evaluates the risk of non-adherence to safety programs, policies and procedures which may result in severe harm to employees, contractors, and the general public.<sup>10</sup> However, one of the risk drivers listed is “deviation from safety policy and procedures.”<sup>11</sup> This implies that the risk event is also its own risk driver. Similarly, for this same risk, another risk driver is "damages to gas pipelines, electric infrastructure, and facilities.”<sup>12</sup> It is not clear how the damage to pipelines is a driver that leads to non-adherence of safety programs; one would assume that in this case the risk driver and risk event were reversed.<sup>13</sup> Many risks have been categorized by the Sempra Utilities as “cross-cutting”<sup>14</sup> and ORA acknowledges that it is

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<sup>8</sup> See Appendix B (Illustrative Partial Workpaper with Blank Components).

<sup>2</sup> Chapter SDGE-1.

<sup>10</sup> See SDGE-3, page SDGE 3-1.

<sup>11</sup> See SDGE-3, page SDGE 3-4.

<sup>12</sup> See SDGE-3, pages SDGE 3-4.

<sup>13</sup> It may be that not following a policy (for example, having SDG&E or SCG staff on site when third party digging occurs near certain pipelines) could lead to pipeline damage. If so, this was not clear from the materials provided.

<sup>14</sup> Based on responses to ORA DR-01, ORA calculates that of the 28 risks listed in the Sempra Utilities’ filings, 12 are categorized as “cross-cutting.”

unlikely that any given risk will be only a risk or only a driver. However, this grey area made evaluation of the appropriateness of risks and proposed mitigations difficult. This was especially true for risks that are less well-defined, such as Climate Change Adaptation (which included wildfire as an effect and land movement as a consequence) and Workforce Planning (which included reliability-related failures as a conceivable consequence and lack of training as a risk driver).

ORA recommends an expanded level of explanation of these higher-level or complex risks in future filings and, where appropriate, spinning off or separating some risks or portions thereof. For example, the physical consequences of the risks outlined in Climate Change Adaptation could be subsumed under some other risks or be their own risk categories (see Sections IV-N and V-G below). Further understanding of how the Sempra Utilities categorize risk may help parties come to better understand the separation or spinning off of some risks. ORA recommends that parties and the Commission continue to explore categorization of the risks.

#### **IV. SDG&E RISKS**

##### **A. SDG&E-1: Wildfires Caused By SDG&E Equipment (Including Third Party Pole Attachments)**

SDG&E's Wildfire risk has a total risk score of 2,551,888. Wildfire risk was SDG&E's highest risk and the total score was approximately 11,000% of the median of the Sempra Utilities' risk scores.<sup>15</sup>

A number of risk drivers were listed for wildfires including vegetation contact, weather-related failures, and downed conductors. Approving all of the proposed mitigations in this chapter would increase utility spending by approximately 705%, from approximately \$138 million (m) to approximately \$1,112m (within a range of \$967m to \$1,257m).<sup>16</sup>

Several of the risk drivers in this chapter appear to be redundant. It is unclear why there is a differentiation between the risk caused by "contact with foreign objects" as opposed to "contact with vegetation".<sup>17</sup> Similarly, it is unclear what the difference is between the risk

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<sup>15</sup> See Appendix A (Risk Summary and Overview Table).

<sup>16</sup> Proposed mitigation costs are given as ranges, thus resulting in a cost range when adding the total costs of the proposed mitigations. These costs include General Rate Case (GRC) and non-GRC spending.

<sup>17</sup> See SDGE 1-7 to SDGE 1-8.

driven by “weather related failure”, “extreme force of nature”, or “climate change impact.”<sup>18</sup> Lastly, there appears to be no difference between “downed conductors” and “contact with foreign objects”, which includes downed conductor due to vehicle contact.

It is unclear how the example given for the “compliance” baseline mitigation is representative of regulatory compliance issues. SDG&E cites the use of marker balls, but it is unclear how the use of marker balls is related to the risk of wildfires caused by SDG&E equipment.<sup>19</sup>

While the Wildfire risk workpapers show how the new frequency values ultimately lead to a new risk score, they do little to elaborate on the process described in the filing for determining the frequency reduction for each risk. This filing could be improved by providing additional information on how the individual mitigations affect the wildfire risk in SDG&E’s service territory. For mitigations that rely on the Wildfire Risk Reduction Model (WRRM) for purposes of determining RSE, ORA recommends that SDG&E provide additional workpapers as appendices to its RAMP filing to further illustrate how the values given by WRRM were derived.

#### **B. SDG&E-2: Catastrophic Damage Involving Third Party Dig-Ins**

SDG&E’s Third Party Dig-In risk has a total risk score of 233,365. Third Party Dig-In risk was SDG&E’s second highest risk and the total score was ~1000% of the median of the Sempra Utilities’ risk scores.<sup>20</sup>

A number of risk drivers were listed for Third Party Dig-Ins including failure of an excavator to call 811 and incorrect performance of locate and tag procedures. Approving all of the proposed mitigations would increase utility spending by approximately 40%, from approximately \$2.6m to approximately \$3.7m (within a range of \$3.5m to \$3.9m).<sup>21</sup>

In this chapter, SDG&E cites the number of significant excavation incidents that occurred in California.<sup>22</sup> It is not clear why SDG&E chose to cite statewide counts of significant dig-ins as opposed to using mortality data. For other risks, SDG&E relies on mortality data from the

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<sup>18</sup> See SDGE 1-7 to SDGE 1-8.

<sup>19</sup> See SDGE 1-14 to SDGE 1-15.

<sup>20</sup> See Appendix A (Risk Summary and Overview Table).

<sup>21</sup> While a large percentage increase, the absolute dollar increase is approximately \$1.1 million a year.

<sup>22</sup> See SDGE 2-11 to SDGE 2-13.

Pipeline Hazardous Materials and Safety Administration (PHMSA).<sup>23</sup> The use of statewide significant incident data might make the risk appear to be greater than it truly is for SDG&E's system, as the statewide data accounts for incidents that may not be as impactful as the worst-case scenario provided by SDG&E.<sup>24</sup> If SDG&E has not had a serious incident in the past 20 years, then the associated risk frequency should reflect that. While ORA understands that frequency is not a perfect substitute for probability, one would expect that for SDG&E's natural gas system, the chance of a serious excavation incident occurring should be around 1 in 20.<sup>25, 26</sup> ORA recommends that all risks should follow a consistent standard in evaluating historical incidents.

The associated workpapers elaborate on the brief description provided in the RAMP filing. However, much of the calculations were explained in a "rationale" section of a calculations table and not calculated in the spreadsheets that were provided to ORA.<sup>27</sup>

SDG&E claims a high safety impact score for the "reasonable worst case scenario", but then gives a high risk frequency score, implying that the worst case scenario has a high chance of occurring every year. However, based on PHMSA data, there have only been two significant excavator-related incidents since 1986, neither of which resulted in fatalities.<sup>28</sup> As a result it appears SDG&E is considering two scenarios when determining the residual risk score. It is ORA's understanding that the approach SDG&E should use to calculate risk scores should reflect a plausible worst-case scenario for that particular risk.

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<sup>23</sup> For example High Pressure Pipeline Failure and Medium Pressure Pipeline Failure.

<sup>24</sup> PHMSA's count of significant incidents include incidents that either result in hospitalization OR \$50,000 in property damage.

<sup>25</sup> PHMSA documents "GDLNGALL Incident Trend Drill to Cause w subtotal 20 yr totals first drill.xlsx" and "GDLNGALL Incident Trend Drill to Cause w subtotal 20 yr totals first drill.xlsx".

<sup>26</sup> Predicted SDGE Incident Rate, Calculations.

<sup>27</sup> CUE DR-01, Q1, Attachment, SDGE-2-WP-RSE Catastrophic Damage Involving Third Party Dig-Ins.

<sup>28</sup> See PHMSA document, gd1986tofeb2004.xlsx, <https://www.phmsa.dot.gov/pipeline/library/data-stats/flagged-data-files>.

### **C. SDG&E-3: Employee, Contractor And Public Safety**

SDG&E's Employee, Contractor, and Public Safety risk has a total risk score of 73,796. Employee, Contractor and Public Safety risk was SDG&E's third highest risk and the total score was ~320% of the median of the Sempra Utilities' risk scores.<sup>29</sup>

A number of risk drivers were listed for the Employee, Contractor, and Public Safety risk including deviation from safety procedures, improper use of protection, and workplace hazards. Approving the proposed mitigations would increase utility spending by approximately 107%, from approximately \$109m to approximately \$226m (within a range of \$206m to \$247m).

This risk chapter is an example of the ORA's general comment that SDG&E inconsistently applies the definition of a risk driver and a risk event. For example, non-adherence to safety programs is itself a driver that leads to risk events, as opposed to a risk event in and of itself. This discrepancy should be clarified for future RAMP filings. It may be more efficient to have risks such as "non-adherence to safety programs" as a driver to be listed under the risk of a particular system or asset failing. The failure of an asset or system would then be the focus point of the risk chapter.

The risk chapter is also vague in grouping mitigations for purposes of calculating RSE. The chapter splits mitigations into two groups: mitigations affecting occupational incidents and mitigations affecting motor vehicle incidents.<sup>30</sup> However, none of the mitigations listed are defined on that basis. Instead, it appears as though parts of some mitigations were separated out in order to meet the criteria of being either in an occupational or motor vehicle-related mitigation. This lack of transparency makes it difficult to evaluate the validity of the baseline and proposed mitigations.

The workpapers support the narrative of the RAMP filing. While ORA notes that the workpapers provide calculations of the methods described in the RAMP filing, the basis of these calculations are controllable motor vehicle incident (CMVI) and Occupational, Safety and Health Administration (OSHA) incident rates.<sup>31</sup> However, it is unclear if using CMVI and OSHA rates serves as representative for all incidents that result from the lack of adherence to safety program and procedures.

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<sup>29</sup> See Appendix A (Risk Summary and Overview Table).

<sup>30</sup> See Sempra Application, SDGE 3-26.

<sup>31</sup> CUE DR-01, Q1, Attachment, SDGE-3-WP-RSE Employee Contractor and Public Safety.

**D. SDG&E-4: Distributed Energy Resources – Safety And Operational Concerns**

SDG&E’s Distributed Energy Resources (DERs) risk has a total score of 73,139. DER risk was SDG&E’s fourth highest risk and the total score was approximately 315% of the median of the Sempra Utilities’ risk scores.<sup>32</sup>

A number of risk drivers were listed for DERs including failures of voltage control devices, emergencies at DER premises, and anti-islanding. Approving the proposed mitigations would increase utility spending by approximately 47%, from approximately \$1.7m to approximately \$2.5m (within a range of \$1.9m to \$3.1m).

One of the proposed mitigations listed is testing of Underwriters Laboratory (UL) equipment. There does not seem to be an indication that incidents occurred because equipment was not in compliance with the UL listing for anti-islanding effect. It is unclear what the basis is for the expected reduction of incidents due to testing the anti-islanding effect of DER equipment.

Many of the risk reductions claimed are based on SME estimates.<sup>33</sup>

**E. SDG&E-5: Major Disturbance to Electrical Service (E.G. Blackout)**

Major Disturbances to Electrical Service (Blackouts) have a total risk score of 44,548. The Blackout risk was tied as SDG&E’s fifth highest risk and the total score was approximately 190% of the median of the Sempra Utilities’ risk scores.<sup>34</sup>

A number of risk drivers were listed for Blackouts including the loss of key transmission assets and generation resource restraints. Approving all of the proposed mitigations would increase utility spending by approximately 6000%, from approximately \$7.5m to approximately \$455m (within a range of \$411m to \$499m).

ORA notes there are discrepancies in the labeling of mitigation measures. One of the proposed mitigations (upgrades) from early in the chapter is treated as a current control program for the purposes of evaluating RSE.<sup>35</sup> It is ORA’s understanding that the proposed mitigations

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<sup>32</sup> See Appendix A (Risk Summary and Overview Table).

<sup>33</sup> CUE DR-01, Q1, Attachment, SDGE-4-WP-RSE Distributed Energy Resources (DERs).

<sup>34</sup> See Appendix A (Risk Summary and Overview Table).

<sup>35</sup> See SDGE 5-22.

should be treated as incremental for the purposes of evaluating RSE. The discrepancy in labeling makes it more difficult to evaluate the reasonableness of the mitigations proposed by SDG&E.

The workpapers in general support the narrative provided in the RAMP filing. Many of the risk reductions provided in the workpapers are based on SME estimates.

#### **F. SDG&E-6: Fail To Blackstart**

SDG&E's Failure To Blackstart risk has a total score of 44,548. Failure To Blackstart was tied as SDG&E's fifth highest risk and the total score was approximately 190% of the median of the Sempra Utilities' risk scores.<sup>36</sup>

A number of risk drivers were listed for Failure To Blackstart including inadequately maintained blackstart equipment and lack of availability of equipment on the cranking path. Approving the proposed mitigations would increase utility spending by approximately 26,150%, from approximately \$0.08m to approximately \$21m (within a range of \$19.4m to \$22.4m).

SDG&E included secondary health effects when assessing the safety impact of this chapter's worst case scenario which may improperly inflate risks. In its assessment, SDG&E claimed that incidents of food poisoning and fires caused by candles should be included in determining the safety impact of blackouts. However, ORA notes that the incidents cited in the RAMP are based on power outages in New England, not incidents in Southern California. ORA recommends that additional state-specific or service area-specific incident data be provided to support the methodology used by SDG&E and that consideration of secondary and tertiary effects be reevaluated in future RAMP filings.

The workpapers in general support the narrative provided in the RAMP filing, particularly by providing illustrative fault trees for the different mitigation groups.

#### **G. SDG&E-7/SCG-3: Cyber Security**

Sempra's Cyber Security risk has a total score of 44,548. Cyber security was SCG's third highest risk and was tied as SDG&E's fifth highest risk, and the total score was approximately 193% of the median of the Sempra Utilities' risk scores.<sup>37</sup> Sempra focused on two essential categories of risk: human-caused (unintentional or deliberate) and outside-event driven (for example, technology failure or force of nature that directly impacts cybersecurity),<sup>38</sup>

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<sup>36</sup> See Appendix A (Risk Summary and Overview Table).

<sup>37</sup> See Appendix A (Risk Summary and Overview Table).

<sup>38</sup> See SCG 3-7 to SCG 3-8.

the latter being an unusual event that circumvents controls or safeguards and leads to an incident without necessarily a human failure. Approving all of SCG's proposed mitigations in this chapter would increase utility spending by approximately 10-fold, from approximately \$7m to approximately \$60m (range of \$45m to \$84m). SDG&E's proposed spending increase is nearly 90%, from approximately \$8.02m to approximately \$15.4m (range of \$10.6m to \$20.2m).

As mentioned in the general comments section, cybersecurity can be a difficult risk to assess because drivers and risks are frequently intertwined (for example, a force of nature causing an event is a driver, but can also be a risk itself).

This risk also lacked explanations or sufficient background data that informed SME-based decision-making. The 'data' tab of Sempra's provided cybersecurity workpaper<sup>39</sup> was very brief and contained no actual data, only risk 'functions' and the basic mathematics that Sempra used to calculate its risk rankings. The Sempra Utilities state that SMEs used data to the extent available, but did not quantify or describe what this data was or how it was used.

As of February 2017, the Sempra Utilities also indicated some concern with sharing their cybersecurity data due to confidentiality concerns, although this has not yet been an active issue for ORA.<sup>40</sup> Going forward, the Commission should clarify how confidential data should be presented in RAMP filings, if used.

Although Sempra cites comparisons to well-known cyberattacks, such as cyberattack on The US Office of Personnel Management,<sup>41</sup> it does not relate these incidents to its own risks or analyze similarities or differences. Many of the frameworks for assessing cybersecurity risks (National Institute of Standards and Technology (NIST) is cited<sup>42</sup>) are not explained and it is not entirely clear whether the Sempra Utilities have adopted all parts of the NIST standards or terms, and whether SCG has any specific corollaries or additions.

The Sempra Utilities' discussion of alternatives is also limited and is essentially limited to "more aggressive implementation" and "less aggressive implementation," with little quantitative backing or explanation of how an appropriate or level of mitigation was determined.

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<sup>39</sup> See Sempra Workpaper "SDGE-7\_SCG-3-WP-RSE Cyber Security.xlsx".

<sup>40</sup> Because ORA's focus in this RAMP filing has generally been on process and procedure, ORA did not perform an in-depth analysis of SCG and SDG&E's proposed costs. Costs will be more fully reviewed in the GRC.

<sup>41</sup> See SCG 3-13.

<sup>42</sup> See SCG 3-5.



## H. SDG&E-8: Aviation Incident

SDG&E's Aviation Incident risk had a total score of 23,108. Aviation Incident risk was SDG&E's ninth highest risk and the total score was approximately the same as the median Sempra Utilities' risk scores.<sup>43</sup>

A number of risk drivers were listed for Aviation Incidents including hardware failure and active errors. Approving all of the proposed mitigations would increase utility spending by approximately 12,000%, from approximately \$0.08m to approximately \$9.7m (within a range of \$8m to \$11.5m).

Proposed mitigations in this chapter are not clearly categorized. Every mitigation included in the Proposed Mitigation section of this chapter, except the acquisition of a new helicopter, is a continuation or expansion of a baseline mitigation.<sup>44</sup> However, all of those mitigations are evaluated as current controls, including the programs that are expanding on their baseline levels.<sup>45</sup> It is unclear why these mitigations need to appear under Proposed Mitigations unless they are being expanded upon in scope. If these mitigations are expanded above and beyond what currently exists, then they must be considered to be incremental mitigations when evaluating RSE, which was not clear from SDG&E's showing.

The alternative mitigation proposing the continued use of a single engine helicopter provides little additional value in identifying possible methods of reducing risk. It is not clear why an alternative mitigation would be to maintain the status quo. In each chapter the baseline mitigations that SDG&E is already implementing have already been scored and given cost data. If a mitigation does not change the capital or operational status quo for a utility, then ORA recommends that it should not be included as an alternative mitigation.

The workpapers in general support the narrative provided in the RAMP filing, although the data presented in the workpapers is relatively sparse compared to other risks in the RAMP filing.

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<sup>43</sup> See Appendix A (Risk Summary and Overview Table).

<sup>44</sup> See SDGE 8-15 to SDGE 8-18.

<sup>45</sup> See SDGE 8-24 to SDGE 8-26.

## **I. SDG&E-9/SCG-5: Workplace Violence**

The Sempra Utilities' workplace violence risk was ranked moderately, with a total score of 23,107. Workplace Violence was SCG's fifth highest risk and SDG&E's tenth highest risk. The total score was ~100% of the median of the Sempra Utilities' risk scores.<sup>46</sup>

The risk was divided into three essential drivers: human failure, procedural failure to mitigate consequences if the risk occurs, and security system failure.<sup>47</sup> SCG also listed some contributing factors (extremist ideology, personnel issues, mental health issues). SCG's proposed increase is approximately 2 to 3-fold, from approximately \$2.4m to approximately \$7m (a proposed range of \$6.4m to \$7.7m). SDG&E's proposed increase is approximately 160%, from \$9.2m to approximately \$24.5m (a proposed range of \$22.5m to \$26.5m). ORA notes that SDG&E's proposed mitigation cost estimate is about three times higher than SCG's estimated. However, there is no explanation as to what the cause of that discrepancy is. This difference is mostly in the cost of "physical/contract security" mitigations.<sup>48</sup>

This risk chapter indirectly raises the issue of whether the Commission should review mitigations that have low Risk Spend Efficiencies. Such a review may be a useful method for the utilities to highlight if particular mandated safety programs are less effective compared to proposed mitigations. The example provided in this chapter is an alternative mitigation called Physical Security Tradeoffs. The Sempra Utilities state that the alternative mitigation would increase the risk exposure and was therefore dismissed. However, there may be an argument that, in order to increase overall safety and decrease overall risk, scaling back baseline mitigations should be permitted or considered if the resources allotted to an inefficient mitigation can be transferred to a more effective mitigation.

As discussed in Section III above, workplace violence is a difficult risk to assess because drivers and risks are frequently intertwined (for example, physical process failures is a driver and a potential risk on their own). SCG cites some contributing factors to this risk, but leaves out others that could contribute to the risk at a systemic level (for example, employee stress levels, pay levels, employee screening processes). It is unclear from the Sempra Utilities' showing why some of these are excluded (or perhaps are assessed elsewhere), while others are included.

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<sup>46</sup> See Appendix A (Risk Summary and Overview Table).

<sup>47</sup> See SCG 5-4.

<sup>48</sup> See SDGE 9/SCG 5-15 through SDGE 9/SCG 5-18.

The Sempra Utilities' workpapers generally seem to reflect what is discussed in the narrative section, but are limited in details and contain very little data.<sup>49</sup> Much of the Sempra Utilities' analysis is also based on national incidence rates,<sup>50</sup> but it is unclear how applicable these are or how valid such a comparison is.

SCG proposes mitigations in two essential categories: training programs and physical security. The proposed expanded mitigations appear quantifiable, but quantitative exploration of alternatives is limited (for example, using more devices and security guards is the proposed mitigation, but the discussion of whether only one of these may be appropriate at certain facilities lacks quantitative justification and metrics).<sup>51</sup>

#### **J. SDG&E-10: Catastrophic Impact Involving High-Pressure Gas Pipeline Failure**

SDG&E's High-Pressure Gas Pipeline risk had a total score of 36,950. High-Pressure Gas Pipeline risk was SDG&E's eighth highest risk and the total score was approximately 160% of the median of the Sempra Utilities' risk scores.<sup>52</sup>

A number of risk drivers were listed for High-Pressure Gas Pipelines including corrosion, incorrect operations, and equipment failures. Approving the proposed mitigations would decrease utility spending by approximately 23%, from approximately \$104m to approximately \$80m (within a range of \$73m to \$86m). However, in its RAMP report SDG&E predicts that spending on its Pipeline Safety Enhancement Plan (PSEP) work will decrease.<sup>53</sup> When excluding the PSEP work the proposed mitigations would increase spending by approximately 11% of the baseline spending, with non-PSEP work increasing from \$12.8m to \$23.9m (within a range of \$22.6m to \$25.1m).

ORA has concerns regarding the frequency risk score for this chapter. SDG&E states that 10 people were killed due to high-pressure pipeline failure.<sup>54</sup> Based on PHMSA's database, nine non-excavation fatalities occurred in California over the last 20 years.<sup>55</sup> ORA's estimate is

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<sup>49</sup> See Sempra Workpaper "SCG-5-WP-RSE Workplace Violence.xlsx".

<sup>50</sup> See Sempra Workpaper "SCG-5-WP-RSE Workplace Violence.xlsx," Tab 'Data'.

<sup>51</sup> See SCG 5-24 to SCG 5-25.

<sup>52</sup> See Appendix A (Risk Summary and Overview Table).

<sup>53</sup> See SDGE 10-17 to 10-18.

<sup>54</sup> See SDGE 10-10 to SDGE 10-11.

<sup>55</sup> See Appendix C (Serious Transmission Pipeline Incidents By Cause).

that this would lead to roughly a fatality every hundred years in SDG&E’s service territory based on SDG&E’s transmission system size as reported to PHMSA. While ORA acknowledges that the frequency of risk events over a period of time is not the same as the probability of an event occurring, these metrics imply that the frequency scores should be in the range of one worst-case scenario occurring every one hundred years, not every 10 to 30 years.

This chapter provides another example of unclear mitigation groupings. It is relatively difficult to determine which mitigations listed in the chapter are included in the different mitigation groupings used to evaluate RSE. This chapter also introduces the term “residual risk modifier.” The purpose of this term is not clearly explained and at first glance, it gives the impression that not funding certain mitigations would actually decrease the risk exposure. Further inspection of SDG&E’s calculations show that the residual risk modifier is an estimate of the *additional* risk if not implementing a baseline mitigation incurred.

The workpapers are helpful in elaborating on the brief descriptions of mitigation RSE provided in the RAMP application.

#### **K. SDG&E-11: Unmanned Aircraft System Incident**

SDG&E’s Unmanned Aircraft System (UAS) Incident risk had a total score of 7,380. UAS Incident risk was SDG&E’s eleventh highest risk and the total score was approximately 32% of the median of the Sempra Utilities’ risk scores.<sup>56</sup>

A number of risk drivers were listed for UAS Incident, including hardware failure and active errors.<sup>57</sup> Approving all of the proposed mitigations would increase utility spending from approximately no spending on baseline mitigations to approximately \$0.135m (within a range of \$0.110m to \$0.160m).

This risk chapter includes a status quo mitigation as an alternative mitigation. This alternative states that in-house and contractor engagement would continue.<sup>58</sup> Under this mitigation, SDG&E’s UAS program would continue to develop, but would not implement systems consistent with the International Civil Aviation Organization (ICAO) and the Federal Aviation Administration (FAA). As noted in the Aviation Incident Section, ORA does not

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<sup>56</sup> See Appendix A (Risk Summary and Overview Table).

<sup>57</sup> An active error is caused by someone not doing something correctly, or in accordance with procedure or policies, even when the intent is to act in accordance with policy or procedures.

<sup>58</sup> See SDGE 11-27.

support the use of alternative mitigations that are essentially status quo proposals. If a mitigation does not change the capital or operational status quo for a utility to help reduce risk, then ORA recommends that it should not be included as an alternative mitigation.

The workpapers associated with this chapter contain relatively little data and do not contribute significantly to the analysis provided in the RAMP filing.

**L. SDG&E-12: Electric Infrastructure Integrity**

SDG&E's Electric Infrastructure Integrity risk had a total score of 5,112. Electric Infrastructure Integrity risk was SDG&E's twelfth highest risk and the total score was approximately 22% of the median of the Sempra Utilities' risk scores.<sup>59</sup>

A number of risk drivers were listed for Electric Infrastructure Integrity, including premature failure or overloading of in-service equipment. Approving all of the proposed mitigations would increase utility spending by approximately 940% from approximately \$51.6m to approximately \$537m (within a range of \$467m to \$607m).

The analysis of this risk has issues that are similar to ORA's comments regarding other chapters. This risk appears vague since it does not include any incident caused by electric equipment failure. Because of this ambiguity, it is difficult to separate this risk from other risks such as wildfire, climate change, and blackout risks.

An alternative mitigation in this chapter is to maintain the status quo. As stated previously, there is little to no additional value in including status quo alternative mitigations. Another alternative mitigation proposed by SDG&E is to extend the period over which replacements occur, which was rejected since doing so would increase the risk exposure.<sup>60</sup> However, this alternative mitigation raises the issue that some existing mitigations may warrant an analysis to explore the efficiency of those mitigations when compared to proposed mitigations.

The workpapers associated with this chapter generally follow the narrative provided in the Electric Infrastructure Integrity section of SDG&E's RAMP filing. However, while the "Data" tab of the associated worksheet supports the procedures explained in the RAMP filing, there is no obvious connection between the work done on the "Data" tab and the risk reduction

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<sup>59</sup> See Appendix A (Risk Summary and Overview Table).

<sup>60</sup> See SDGE 12-33.

calculations performed on the “Analysis” tab.<sup>61</sup> In particular the calculations used to determine the new frequency values are not present in the workpapers.

#### **M. SDG&E-13: Records Management**

SDG&E’s Records Management risk had a total score of 4,734. The Records Management risk was SDG&E’s thirteenth highest risk and the total score was approximately 21% of the median of the Sempra Utilities’ risk scores.<sup>62</sup>

A number of risk drivers were listed for Records Management including insufficient training and insufficient data back-up policies. Approving all of the proposed mitigations would increase utility spending by approximately 234%, from approximately \$33.2m to approximately \$111m (within a range of \$467m to \$607m).

ORA notes that this risk chapter illustrates a potential flaw with the integer-based frequency scores. SDG&E states that implementing the proposed mitigation reduces the rate of incidents from once every 12 years to once every 27 years . However, according to the Sempra Utilities’ ranking system criteria, this reduction would not affect the risk score.

The workpapers associated with this chapter are generally difficult to follow. While it is possible to follow the related spreadsheet to see what calculations were performed, there is little notation provided to explain what those steps are intended to represent.

#### **N. SDG&E-14: Climate Change Adaptation**

SDG&E’s Climate Change Adaptation risk had a total score of 2,656. Climate Change Adaptation risk was SDG&E’s fourteenth highest risk and the total score was approximately 12% of the median of the Sempra Utilities’ risk scores.<sup>63</sup>

A number of risk indicators were listed for Climate Change Adaptation, including increases in the potential for storm events and increased wildfire frequency. Approving all of the proposed mitigations would increase utility spending by approximately 2100%, from approximately \$0.02m to approximately \$0.44m (within a range of \$.37m to \$.51m).

The residual risk score given for this risk stems largely from the heightened risk of there being a wildfire. It is difficult to determine whether the concerns of this risk are more

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<sup>61</sup> CUE DR-01, Q1, Attachment, SDGE-12-WP-RSE Electric Infrastructure Integrity.

<sup>62</sup> See Appendix A (Risk Summary and Overview Table).

<sup>63</sup> See Appendix A (Risk Summary and Overview Table).

appropriately included under the Wildfire chapter. Figure 1 in SDGE-14<sup>64</sup> shows climate change as the possible cause of an event, which leads to system outages, which leads to additional maintenance. This is another case of ambiguity regarding what SDG&E is attempting to mitigate.

This chapter appears to be an analysis of a driver for other risks. While many of the mitigations appear well-intended, it is not clear how many of these will affect the risk of “adjustment in natural or human systems in response to actual or expected climatic changes.” The overall focus of this chapter is that more information needs to be gathered.

**O. SDG&E-15: Public Safety Events – Electric**

SDG&E’s Public Safety Events-Electric risk had a total risk score of 2,334. Public Safety Events - Electric risk was SDG&E’s fifteenth highest risk and the total score was approximately 10% of the median of the Sempra Utilities’ risk scores.<sup>65</sup>

A number of risk drivers were listed for Public Safety Events – Electric including noncompliance with security procedures and failure of security systems. Approving all of the proposed mitigations would increase utility spending by approximately 113%, from approximately \$25.8m to approximately \$54.8m (within a range of \$3.5m to \$3.9m).

ORA finds the definition of this risk to be overly broad. The risk is defined as a risk that “involves public safety and/or property damage related to SDG&E infrastructure, employees or third parties. Injuries to the public or equipment damage or failure can happen in a variety of ways such as motor vehicle accidents, intentional sabotage, construction site activity and non-compliance with safety procedures.”<sup>66</sup> This risk has a broad overlap with any electric infrastructure risk that has a safety impact, especially with Employee Contractor, and Public Safety and Blackout.

It is difficult to determine whether the “risk” described in this chapter is truly a risk or a list of risk consequences. Many of the items listed in the driver section of the chapter, such as failure of security systems and intentional acts involving electric infrastructure, appear to be risk events themselves. When evaluating the lists of drivers and consequences, there doesn’t seem to

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<sup>64</sup> See page SDGE-14-15.

<sup>65</sup> See Appendix A (Risk Summary and Overview Table).

<sup>66</sup> See 15-2.

be a need to include this “risk” as a middle man; each driver identified under this risk should be considered separately.

The list of mitigations is overly broad. The list of mitigations includes: Physical Security; Communications and Outreach; and Design, Operations, and Maintenance.

The workpapers generally support the narrative provided in the RAMP filing, although the data presented in the workpapers is relatively sparse compared to other risks in the RAMP filing.

**P. SDG&E-16: Catastrophic Damage Involving Medium-Pressure Pipeline Failure**

SDG&E’s Catastrophic Damage Involving Medium-Pressure Pipeline Failure risk had a total risk score of 2,334. The Medium Pressure Pipeline risk was SDG&E’s sixteenth highest risk and the total score was approximately 10% of the median of the Sempra Utilities’ risk scores.<sup>67</sup>

A number of risk drivers were listed for Medium Pressure Pipeline Failure, including corrosion and incorrect operations. Approving the proposed mitigations would increase utility spending by approximately 1300%, from approximately \$16.9m to approximately \$238m (within a range of \$214m to \$262m).

As noted in Section III above, the calculations in this chapter(?) do not clearly explain the calculations associated with risk reduction and the meaning of “Residual Risk Modifier.” The purpose of this term is not clearly explained and gives the impression that not funding certain mitigations would actually decrease the risk exposure. Further inspection of SDG&E’s calculations have shown that the residual risk modifier is an estimate of the *additional* risk that not implementing a baseline mitigation would incur. Therefore not funding certain mitigations with a residual risk modifier would not necessarily reduce the risk.

SDG&E states that 9 people were killed between 1996 to 2015 due to medium-pressure pipeline failure.<sup>68</sup> Based on PHMSA’s database, there have been six non-excavation related fatalities that occurred in California over the last 20 years.<sup>69</sup> ORA’s estimate is that this would lead to roughly 1 fatality every forty years in SDG&E’s service territory based on the size of

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<sup>67</sup> See Appendix A (Risk Summary and Overview Table).

<sup>68</sup> See SDGE 10-10 to SDGE 10-11.

<sup>69</sup> See Appendix D (Serious Distribution Pipeline Incidents By Cause).



SDG&E's distribution system. While event frequency is not the same as likelihood of occurrence, it would appear that this risk should be scored based on a frequency of occurring once every 30 to 100 years, instead of every 10 to 30 years as scored by SDG&E.<sup>70</sup>

It is unclear if the Distribution Integrity Management Program (DIMP) mitigation (marked as a current control) is meant to include just the baseline DIMP work or also the proposed acceleration of DIMP work, which was listed as a proposed mitigation. Additionally, ORA does not agree with listing "DIMP status quo" as an alternative mitigation.<sup>71</sup> If a mitigation does not change the capital or operational status quo for a utility, then ORA recommends that it should not be included as an alternative mitigation.

The workpapers generally support the narrative provided in the RAMP filing, although the data presented in the workpapers is relatively sparse compared to other risks in the RAMP filing.

**Q. SDG&E-17: Workforce Planning**

SDG&E's Workforce Planning risk has a total risk score of 255. Workforce planning was SDG&E's seventeenth-highest risk and the total score was ~1% of the median of the Sempra Utilities' risk scores.<sup>72</sup>

A number of risk drivers were listed for Workforce planning, including economic factors, increased demand for specialized skills, and an increasing number of retirement-eligible employees. Approving all of the proposed mitigations would increase utility spending by approximately 50%, from approximately \$1.9m to approximately \$5.3m (within a range of \$3.6m to \$7m).

This particular risk is difficult to assess due to the nebulous nature of how this risk affects other risks as well as how various values within the risk are defined. For example, the worst-case scenario is assumed to be an incident caused by an inexperienced employee. The consequence of this risk was capped to match an event that has only moderate consequences. However, the risk of someone making a mistake due to inexperience could result in a major incident that should be scored much higher than the score provided in this chapter. It is not explained why the risk score's consequence component is not higher.

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<sup>70</sup> See SDG&E 16-9.

<sup>71</sup> See SDGE 16-25.

<sup>72</sup> See Appendix A (Risk Summary and Overview Table).

Additionally, the connection between the mitigations and the analysis used in determining the RSE is questionable. In evaluating the RSE for baseline mitigations, SDG&E uses the risk of incidents that occur due to incorrect operations as a proxy for risk caused by a lack of workforce planning. However, this connection leaves explanatory gaps such as how this pertains to electrical incidents. Also, the way in which this risk ties in with other risks would lead one to assume that all incidents caused by incorrect operations are caused solely by deficiencies in workforce planning.

The workpapers provided generally reflect the explanations provided in the RAMP filing. However, SDG&E's Workforce Planning workpapers do not provide sufficient information regarding incremental mitigations because they are limited to the two factors (seniority and proficiency/years of seniority) used to develop a risk reduction score.

## **V. SOCALGAS RISKS**

### **A. SCG-1: Catastrophic Damage Involving Third Party Dig-Ins**

SCG's Catastrophic Damage Involving Third-party Dig-ins risk has a total risk score of 233,365. Catastrophic Damage Involving Third-party Dig-ins was SCG's highest risk and the total score was approximately 1000% of the median of the Sempra Utilities' risk scores.<sup>73</sup>

ORA's comments on this risk are reflected in its general comments in Section III above.

### **B. SCG-2: Employee, Contractor And Public Safety**

SCG's Employee, Contractor, and Public Safety risk has a total risk score of 233,265. Employee, Contractor, and Public Safety was SCG's highest risk and the total score was approximately 1000% of the median of the Sempra Utilities' risk scores.<sup>74</sup>

ORA's comments on this risk are reflected in its general comments in Section III above.

### **C. SCG-4: Catastrophic Damage Involving A High-Pressure Gas Pipeline Failure**

SCG's Catastrophic Damage Involving a High-Pressure Gas Pipeline Failure risk has a total risk score of 36,950. Catastrophic Damage Involving a High-Pressure Gas Pipeline Failure was SCG's fourth-highest risk and the total score was approximately 160% of the median of the Sempra Utilities' risk scores.<sup>75</sup>

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<sup>73</sup> See Appendix A (Risk Summary and Overview Table).

<sup>74</sup> See Appendix A (Risk Summary and Overview Table).

<sup>75</sup> See Appendix A (Risk Summary and Overview Table).

ORA's comments on this risk are reflected in its general comments in Section III above.

**D. SCG-6: Physical Security Of Critical Gas Infrastructure**

SCG's Physical Security of Critical Gas Infrastructure risk has a total risk score of 23,107. Physical Security of Critical Gas Infrastructure was SCG's fifth-highest risk and the total score was approximately 100% of the median of the Sempra Utilities risk scores.<sup>76</sup>

ORA's comments on this risk are reflected in its general comments in Section III above.

**E. SCG-7: Workforce Planning**

SCG's Workforce Planning risk has a total risk score of 5,774. Workforce planning was SCG's seventh-highest risk and the total score was approximately 25% of the median of the Sempra Utilities' risk scores.<sup>77</sup>

A number of risk drivers were listed for workforce planning, including improved economic environment, transiency of millennials, and increased demand for specialized skills. Generally, these drivers are not quantified beyond a general or high level (for example, the nationwide tendency of young people to change jobs within a certain period). Workforce planning has substantial overlap with other risk areas, and for this reason, the largest risk mitigation cost category (Non-HR Technical Training) was not included in SCG's proposal.<sup>78</sup> Approving all of the proposed mitigations would increase utility spending by approximately 50%, from approximately \$28m to approximately \$40m (within a range of \$35m to \$46m).

Perhaps more than any other risk ORA analyzed, Workforce Planning proved to be very difficult to assess because both the drivers and mitigations had a very high level of overlap with other risks or mitigations. For example, SCG's worst-case scenario is essentially a badly-trained employee causing an outage,<sup>79</sup> but it is difficult to see a way in which this can be completely (or possibly even partially) attributed to a workforce planning risk without also including other factors, such as training issues and salary/recruitment issues. This is not to say that workforce planning should not be taken seriously, but the measurement and description will likely need further refinement to be on the same level as more technically-focused risks.

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<sup>76</sup> See Appendix A (Risk Summary and Overview Table).

<sup>77</sup> See Appendix A (Risk Summary and Overview Table).

<sup>78</sup> See SCG 7-20.

<sup>79</sup> See SCG 7-9.

SCG's attempt to quantify workforce planning risk by the use of the proxy measure of incidents<sup>80</sup> is largely unexplained and dubious for, among other reasons, the issue of dividing cause into certain categories or specific events/causes, as discussed above.

SCG's workpapers generally reflect the discussion in the narrative section of the chapter, but the usefulness of the data is very limited because it essentially quantifies a metric (percentage of workforce eligible for retirement) that is only part of the story and of questionable connection.

SCG states that its Workforce Planning risk is expected to increase<sup>81</sup> and that the proposed mitigations will maintain the risk at its current level. In light of the concerns about the difficulty in quantifying this risk, ORA recommends that this process be better justified and/or explored in future RAMP filings.

In future filings, Sempra may want to consider subsuming some parts of Workforce Planning risk under other sections (for example, training procedures or knowledge transfer) and limiting workforce planning to a more narrow scope to make the assessment more manageable and useful.

SCG's proposed alternatives are fairly limited scope and there is little discussion of their individual effectiveness. Therefore, it is difficult to assess how the alternatives may rank and how valid their dismissal was.

#### **F. SCG-8: Records Management**

SCG's Records Management risk has a total risk score of 4,734. Records Management was SCG's eighth-highest risk and the total score was approximately 21% of the median of the Sempra Utilities' risk scores.<sup>82</sup>

SCG focused on three essential risk drivers: insufficient training, insufficient resource for practices, and poor data backup policies. Approving all of the proposed mitigations would increase utility spending by approximately 5-fold, from approximately \$28m to approximately \$120m (range of \$113m to \$138m). SCG's proposed mitigations are to continue current practices, but at an expanded scale.

The workpapers accompanying records management were fairly limited, but not more than other risks in this RAMP filing. The past expenditures and related quantifications are

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<sup>80</sup> See Sempra Workpaper "SCG-7-WP-RSE Workforce Planning.xlsx," tab 'Data'.

<sup>81</sup> See, for example, SCG 7-13.

<sup>82</sup> See Appendix A (Risk Summary and Overview Table).

reasonably well-developed, but there is very little information on how SMEs picked their worst-case scenario.

SCG's discussion of alternatives (no change or a more centralized IT infrastructure<sup>83</sup>) is limited, but given the fact that the proposed mitigations have few new proposals, this is to be expected.

#### **G. SCG-9: Climate Change Adaptation**

SCG's Climate Change Adaptation risk has a total risk score of 2,656. Climate Change Adaptation was SCG's ninth-highest risk and the total score was approximately 12% of the median of the Sempra Utilities' risk scores.<sup>84</sup>

SCG listed two drivers as "increase in global temperatures" and "storm surge" with a number of identified threats, including increased storm events, sea level rise, and increased wildfires. Approving the proposed mitigations would increase utility spending by approximately 17-fold, from approximately \$1m to approximately \$17m (within a range of \$15m to \$19m).

Similar to workforce planning (see Sections IV-Q and V-E above), SCG's Climate Change Adaptation risk was very difficult to assess because many of the drivers and effects are shared between other risks or are other risks themselves. The most prescient risk is increased wildfire risk and increased intensity of storm events, which can impact infrastructure.

In future RAMP filings, ORA recommends removing any physical infrastructure funding or programs from the Climate Change Adaptation risk and either subsuming them under a different category or creating a new category for this risk category. Climate change adaptation could be limited to geological monitoring and similar measures to inform those other risks.<sup>85</sup>

An additional concern ORA has with the Climate Change Adaptation risk is that, presumably, climate change and its effects would impact SCG's engineering and design (for example, how close pipelines are built to bodies of water, or how much land movement is expected over the lifetime of a project), but these concerns are not explicitly mentioned in this chapter. For example, if rainfall patterns are forecasted to change in the desert, SCG should be aware of this and adjust its risk calculations appropriately.

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<sup>83</sup> See SCG 8-19 to SCG 8-20.

<sup>84</sup> See Appendix A (Risk Summary and Overview Table).

<sup>85</sup> Climate change, based on the approach taken for SCG, appears to be a modifier to other, separately identified risks. As such, the mitigations or parts thereof may be better handled under those risks.

SCG did not perform a RSE analysis for Climate Change Adaptation because “there is no linkage to adaptive or corrective actions which would have any measurable effect on the probability of their predicted safety consequences.”<sup>86</sup> If that is the case, then there is a good argument for moving climate change-caused issues to other risk categories, where they can be more readily and appropriately categorized.

SCG’s description of alternatives is very limited, but this may be appropriate at least for the geological analysis part of Climate Change Adaptation as filed. If the physical risks were to stay in this category, contrary to ORA’s recommendation, it would be beneficial to see more alternatives proposed with respect to project siting, advanced monitoring, etc.

Relative to the rest of the RAMP filing, the Climate Change Adaptation section appears to be a low risk development status, although some of this may be due to the more nebulous nature of this risk in particular.

#### **H. SCG-10: Catastrophic Damage Involving A Medium-Pressure Pipeline Failure**

SCG’s Catastrophic Damage Involving a Medium-Pressure Pipeline Failure risk has a total risk score of 2,344. Catastrophic Damage Involving a Medium-Pressure Pipeline Failure was SCG’s second-lowest risk and the total score was approximately 10% of the median of the Sempra Utilities’ risk scores.<sup>87</sup>

ORA’s comments on this risk are reflected in its general comments in Section III above.

#### **I. SCG-11: Catastrophic Event Related To Storage Well Integrity**

SCG’s Catastrophic Event Related to Storage Well Integrity risk has a total risk score of 1,826. Catastrophic Event Related to Storage Well Integrity was SCG’s lowest-ranked risk and the total score was approximately 8% of the median of the Sempra Utilities’ risk scores.<sup>88</sup>

ORA’s comments on this risk are reflected in its general comments in Section III above.

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<sup>86</sup> See SCG 9-1.

<sup>87</sup> See Appendix A (Risk Summary and Overview Table).

<sup>88</sup> See Appendix A (Risk Summary and Overview Table).

## **VI. RECOMMENDATIONS FOR FUTURE RAMP FILINGS**

### **A. Alternative Mitigation RSE Scores**

As noted by the Commission's Safety and Enforcement Division (SED), the alternative mitigations provided at the end of each chapter were not accompanied by RSE. One of the key points in making the RAMP filing transparent to all parties is that the quantitative decision-making process must be available not only for baseline and proposed mitigations, but for the alternative mitigations as well. It is just as important to see why a mitigation was considered, but ultimately rejected, as it is to see why a different mitigation was considered and accepted as a proposed mitigation.

### **B. Changes to Reported Risks**

ORA suggests that future RAMP filings should document whether new risks have been added or if risks from previous filings have been removed. If the list of risks in a filing has changed, the Sempra Utilities should specify why the change occurred. Additionally, if mitigations that were recommended and given a reduced risk score in the RAMP filing are implemented as a result of the GRC process, the Sempra Utilities should include that item as a baseline mitigation and explain any deviation from the predicted RSE value given before. However, these suggestions will be of minimal value until a standard method is implemented over several RAMP proceedings, but it is worth starting this analysis with this RAMP. ORA recommends that the Commission direct the IOUs to provide that level of continuity of tracking the changes to reported risks due to the implementation of mitigations.

### **C. Risk Data Timeframe**

The Sempra Utilities used 2015 data as a basis for evaluating Risk Mitigation. It is not clear why the 2015 mitigations were used as their basis. ORA's recommendation is to provide the past three-year's worth of data as a basis because this will help capture trends and reduce the impact of any abnormality in the data, and will show how risks have changed, been mitigated, or if there has been any underlying change in risk calculation methodology.

### **D. Proposed Mitigation Format**

The Sempra Utilities showing is inconsistent in how it lists the proposed mitigations in each chapter. Some of the chapters include the baseline mitigations in the list of proposed mitigations,<sup>89</sup> some of which are expanded and others included as mitigations that are to be

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<sup>89</sup> See, for example, Appendix A (Risk Summary and Overview Table).

continued at their current level of implementation. For example, in SDG&E-5 one of the proposed mitigations is to modernize the grid control centers. However, this mitigation is also listed as an alternative mitigation.<sup>20</sup> Additionally (in SDG&E-8), two of the baseline mitigations, aviation safety management system and job site observation program, are also listed as proposed mitigations that are unchanged.<sup>21</sup> However, other risk chapters do not necessarily do the same with unchanged baselines in their respective chapters. It appears that these chapters were developed in isolation and the mitigations of each chapter were presented in a fashion that was not representative of a cohesive company filing. ORA suggests that a standard method be used in determining which mitigations are assigned to the baseline, proposed, and alternative sections of the chapters.

## **VII. CONCLUSION**

ORA submits its comments on the Sempra Utilities' RAMP filings. ORA's analysis of the SCG and SDG&E's RAMP filing has found that the utilities have essentially met the requirements of D.16-08-018. In addition, ORA agrees with SED and other parties that the RAMP process is an evolving process that should benefit from continued learning and improvement. ORA recognizes and appreciates the efforts of the Sempra Utilities to prepare this first-ever RAMP filing.

Overall, the use of quantitative data and analysis is insufficient. While the RAMP process is still in its nascent stage and data may not be available for all cases, an increased quantitative rigor would benefit the Commission and all parties going forward. As described above, ORA also recommends changes to workpaper format and availability to make analysis in future RAMPs more clear and effective. The Commission and parties should continue to discuss the distinctions and overlaps between risks and risk drivers (for example, wildfire as a risk but also risk driver under Climate Change Mitigation). While such distinction is not always easy (or even possible), further clarity and distinction where possible will help make risk-based decision-making easier.

In future RAMP filings, ORA recommends that alternative mitigations be assessed with Risk-Spend Efficiency Scores as proposed mitigations are. Changes to reported risks should be outlined in the filing and risk data should cover a longer timeframe than the most recent year (for

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<sup>20</sup> See SDGE-5-23 through SDGE-5-24.

<sup>21</sup> See SDGE-8-15 through SDGE-8-16.



example, the most recent three years). Future RAMP filings should have a standardized proposed mitigation format insofar as possible to help determine which mitigations are baselines, proposed, and alternatives.

Respectfully submitted,  
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## **APPENDIX A**

### **ORA Risk Summary and Overview Table**

Risk	Score	Utility Rank	Total Rank	%Max	% Median	Baseline Cost (Million \$)	Median Proposed Cost (Million \$)	% Cost Increase
SoCalGas Risks								
Third-Party Dig-ins	233,365	1	2	9.1%	1009.9%	23	39.75	73%
Public Safety	233,365	1	2	9.1%	1009.9%	135	195	44%
Cybersecurity	44,548	3	7	1.7%	192.8%	7	60	757%
High-pressure Pipe	36,950	4	11	1.4%	159.9%	559	839.5	50%
Workplace Violence	23,107	5	14	0.9%	100.0%	2.4	7	192%
Gas Physical Security	23,107	5	14	0.9%	100.0%	7.1	31.95	350%
Workforce Planning	5,774	7	18	0.2%	25.0%	28	40	43%
Records Management	4,734	8	20	0.2%	20.5%	28	120	329%
Climate Change Adaptation	2,656	9	22	0.1%	11.5%	1	17	1600%
Medium-pressure Pipe	2,344	10	24	0.1%	10.1%	109	520.5	378%
Storage Well Integrity	1,826	11	27	0.1%	7.9%	47.1	357	658%
SDG&E Risks								
Wildfires	2,551,888	1	1	100.0%	11043.8%	138	1112	706%
Third-Party Dig-ins	233,365	2	2	9.1%	1009.9%	2.6	3.7	42%
Public Safety	73,796	3	5	2.9%	319.4%	109	226	107%
DER	73,139	4	6	2.9%	316.5%	1.7	2.5	47%
Blackout	44,548	5	7	1.7%	192.8%	7.5	455	5967%
Fail to Black Start	44,548	5	7	1.7%	192.8%	0.08	21	26150%
Cybersecurity	44,548	5	7	1.7%	192.8%	8.02	15.4	92%
Aviation	23,108	9	13	0.9%	100.0%	0.08	9.7	12025%
Workplace Violence	23,107	10	14	0.9%	100.0%	9.2	24.5	166%
High-pressure Pipe	36,950	8	11	1.4%	159.9%	104	80	-23%
Unmanned Aircraft	7,380	11	17	0.3%	31.9%	0	0.135	N/A
Electric Integrity	5,112	12	19	0.2%	22.1%	51.6	537	941%

<b>Risk</b>	<b>Score</b>	<b>Utility Rank</b>	<b>Total Rank</b>	<b>%Max</b>	<b>% Median</b>	<b>Baseline Cost (Million \$)</b>	<b>Median Proposed Cost (Million \$)</b>	<b>% Cost Increase</b>
Records Management	4,734	13	20	0.2%	20.5%	33.2	111	234%
Climate Change Adaptation	2,656	14	22	0.1%	11.5%	0.02	0.44	2100%
Public Safety Events Electric	2,344	15	24	0.1%	10.1%	25.8	54.8	112%
Medium-pressure Pipe	2,344	15	24	0.1%	10.1%	16.9	238	1308%
Workforce Planning	255	17	28	0.0%	1.1%	1.9	5.3	179%

## **APPENDIX B**

### **Illustrative Partial Workpaper with Blank Components**

Project ID	Name	Description	(000s)		New/Existing	Life of the Project	Rationale	Frequency %	New Frequency	New Score	New Score (for life of project)	Weighted New Score	Cost	RSE	Rank			
			Capital Cost (2017-2019)	OM Cost (2017-2019)														
B1	Transmission Integrity Management Program is closely Monitored and given high priority. Frequent audits are conducted.	In-Line Inspection (ILI)	\$ (180,453)	\$ (49,777)	Existing	7	Incident rate shifts to worst state performance and 3/7 of the assets are being mitigated	-966.80	0.62	394,187	(2,500,657)	- 2,500,657	#####	4.73	3			
		External Corrosion Direct Assessment (ECDA)																
		Threat and Risk Assessment																
		Integrity Assessments																
		Preventative and Mitigation Measures																
	Internal Corrosion plan has been launched within Storage	Maintenance of High Pressure Storage Lines																
		Condition Based Maximo Work Orders																
		Internal Corrosion Consultants																
		Internal Corrosion Monitoring Equipment																
B2	Approved PSEP program to test or replace High Consequence Area High Pressure pipelines that do not meet current records criteria. Program has continuous monitoring and prioritizing of lines with timely completion of remediation.	High Pressure Pipeline Replacement	\$ (487,000)	\$ (61,750)	Existing	64	Incident rate shifts to worst state performance and 100 miles per year are done over 3 years	-105.76	0.12	76,029	(2,501,005)	- 2,501,005	#####	0.56	4			
		High Pressure Pipeline Hydrotesting																
		High Pressure Pipeline Record Search																
		Transmission Valve Automation and Replacement																
B3	Employees are comprehensively trained (e.g., operator qualified) to perform compliance inspections.	Transmission Pipeline Technician Training	\$ (30)	\$ (2,434)	Existing	1	Incorrect operations goes to worst state performance (a third of the way) and is compared against current performance	-91.45	0.11	70,741	(33,791)	- 33,791	-\$2,464.00	13.71	2			

Source: SCG Workpaper "SCG-4-WP-RSE Catastrophic Damage Involving High Pressure Pipeline Failure.xlsx" tab "Analysis"

## **APPENDIX C**

### **Serious Transmission Pipeline Incidents by Cause**

Reports showing details about each incident are available by clicking on any blue link in the report below.

[Serious Pipeline Incidents By Cause](#)  
Date run: 2/21/2017

Portal - Data as of **2/21/2017**

Data Source: US DOT Pipeline and Hazardous Materials Safety Administration

**Serious Incident Cause Breakdown: 20 Year Totals (1997-2016)**  
System Type: GAS TRANSMISSION State: CALIFORNIA Offshore: ALL

Reported Cause of Incident	Incident Cause SubType	Number	%	Fatalities	Injuries	Total Cost As Reported	Total Cost Current Year Dollars	Barrels Spilled	Net Barrels Lost
<b>ALL OTHER CAUSES</b>	MISCELLANEOUS	1	14.3%	1	1	\$0	\$0	0	0
<b>ALL OTHER CAUSES Total</b>		<b>1</b>	<b>14.3%</b>	<b>1</b>	<b>1</b>	<b>\$0</b>	<b>\$0</b>	<b>0</b>	<b>0</b>
<b>EXCAVATION DAMAGE</b>	THIRD PARTY EXCAVATION DAMAGE	4	57.1%	3	15	\$5,036,700	\$5,235,639	0	0
<b>EXCAVATION DAMAGE Total</b>		<b>4</b>	<b>57.1%</b>	<b>3</b>	<b>15</b>	<b>\$5,036,700</b>	<b>\$5,235,639</b>	<b>0</b>	<b>0</b>
<b>MATERIAL/WELD/EQUIP FAILURE</b>	MANUFACTURING-RELATED	1	14.3%	8	51	\$558,363,000	\$615,878,406	0	0
<b>MATERIAL/WELD/EQUIP FAILURE Total</b>		<b>1</b>	<b>14.3%</b>	<b>8</b>	<b>51</b>	<b>\$558,363,000</b>	<b>\$615,878,406</b>	<b>0</b>	<b>0</b>
<b>NATURAL FORCE</b>	UNSPECIFIED	1	14.3%	0	1	\$4,000,000	\$5,647,298	0	0



DAMAGE	NATURAL FORCE DAMAGE								
<b>NATURAL FORCE DAMAGE Total</b>		<b>1</b>	<b>14.3%</b>	<b>0</b>	<b>1</b>	<b>\$4,000,000</b>	<b>\$5,647,298</b>	<b>0</b>	<b>0</b>
<b>Grand Total</b>		<b>7</b>	<b>100.0%</b>	<b>12</b>	<b>68</b>	<b>\$567,399,700</b>	<b>\$626,761,343</b>	<b>0</b>	<b>0</b>

**Serious Incident Cause Breakdown 20 Year Average (1997-2016)**  
**System Type: GAS TRANSMISSION State: CALIFORNIA Offshore: ALL**

## **APPENDIX D**

### **Serious Distribution Pipeline Incidents by Cause**

Reports showing details about each incident are available by clicking on any blue link in the report below.

[Serious Pipeline Incidents By Cause](#)  
 Date run:  
 3/21/2017

Portal - Data as of **3/21/2017**

Data Source: US DOT Pipeline and Hazardous Materials Safety Administration

**Serious Incident Cause Breakdown: 20 Year Totals (1997-2016)**  
**System Type: GAS DISTRIBUTION State: CALIFORNIA**

Reported Cause of Incident	Incident Cause SubType	Number	%	Fatalities	Injuries	Total Cost As Reported	Total Cost Current Year Dollars	Barrels Spilled	Net Barrels Lost
<b>ALL OTHER CAUSES</b>	MISCELLANEOUS	7	25.0%	1	9	\$850,500	\$1,142,997	0	0
	UNKNOWN	1	3.6%	0	2	\$11,000	\$12,013	0	0
<b>ALL OTHER CAUSES Total</b>		<b>8</b>	<b>28.6%</b>	<b>1</b>	<b>11</b>	<b>\$861,500</b>	<b>\$1,155,011</b>	<b>0</b>	<b>0</b>
<b>CORROSION</b>	INTERNAL	1	3.6%	0	1	\$405,100	\$493,571	0	0
<b>CORROSION Total</b>		<b>1</b>	<b>3.6%</b>	<b>0</b>	<b>1</b>	<b>\$405,100</b>	<b>\$493,571</b>	<b>0</b>	<b>0</b>
<b>EXCAVATION DAMAGE</b>	OPERATOR/CONTRACTOR EXCAVATION DAMAGE	1	3.6%	0	1	\$1,000	\$1,118	0	0

	THIRD PARTY EXCAVATION DAMAGE	8	28.6%	3	7	\$406,000	\$567,953	0	0
<b>EXCAVATION DAMAGE Total</b>		<b>9</b>	<b>32.1%</b>	<b>3</b>	<b>8</b>	<b>\$407,000</b>	<b>\$569,070</b>	<b>0</b>	<b>0</b>
<b>INCORRECT OPERATION</b>	INCORRECT OPERATION	2	7.1%	0	2	\$2,000	\$2,252	0	0
	UNSPECIFIED INCORRECT OPERATION	1	3.6%	0	1	\$78,000	\$108,743	0	0
<b>INCORRECT OPERATION Total</b>		<b>3</b>	<b>10.7%</b>	<b>0</b>	<b>3</b>	<b>\$80,000</b>	<b>\$110,994</b>	<b>0</b>	<b>0</b>
<b>OTHER OUTSIDE FORCE DAMAGE</b>	OTHER OUTSIDE FORCE DAMAGE	1	3.6%	0	1	\$1,000,000	\$1,063,456	0	0
	VEHICLE NOT ENGAGED IN EXCAVATION	6	21.4%	5	5	\$131,727	\$138,867	0	0
<b>OTHER OUTSIDE FORCE DAMAGE Total</b>		<b>7</b>	<b>25.0%</b>	<b>5</b>	<b>6</b>	<b>\$1,131,727</b>	<b>\$1,202,323</b>	<b>0</b>	<b>0</b>
<b>Grand Total</b>		<b>28</b>	<b>100.0%</b>	<b>9</b>	<b>29</b>	<b>\$2,885,327</b>	<b>\$3,530,969</b>	<b>0</b>	<b>0</b>

**Serious Incident Cause Breakdown 20 Year Totals (1997-2016)**  
**System Type: GAS DISTRIBUTION State: CALIFORNIA**