Risk Assessment Mitigation Phase
Risk Mitigation Plan
Records Management
(Chapter SDG&E-13)

November 30, 2016

TABLE OF CONTENTS

310316

Executive Summary

The Records Management risk relates to the potential public safety, property, reliability, regulatory, or financial impacts that result from the use of inaccurate or incomplete records.

To assess this risk, SDG&E first identified a reasonable worst case scenario and scored the scenario against five residual impact categories (e.g., Health, Safety, Environmental; Operational & Reliability, etc., discussed in Section 3). Then, SDG&E considered as a baseline, the SDG&E mitigation in place for Records Management in 2015 and estimated the costs (costs are discussed in Section 7). SDG&E identified the following controls as of 2015:

1. Administrative: adherence to existing records management policies and practices, including audits;
2. Training: biennial training for records management and compliance team meetings;
3. Operational Compliance and Oversight: records management within each business group; and
4. Information Management Systems: existing IT applications, including but not limited to Geographic Information Systems (GIS).

The current records management controls focus on safety-related impacts (e.g., Health, Safety, and Environment) per guidance provided by the Commission in Decision 16-08-018 and may address reliability and regulatory impacts as well.

Based on the foregoing assessment, SDG&E proposed future mitigations. For Records Management, SDG&E proposed to continue the four control categories identified above with enhancements in each category. The proposed enhancements include:

1. Administrative: SDG&E proposes to hire a third-party records management expert to provide recommendations on its records management policies and practices.
2. Training: SDG&E proposes to increase the frequency of training from biennial to annual and provide additional training specific to operational personnel.
3. Operational Compliance and Oversight: SDG&E proposes to launch a centralized records management organization.
4. Information Management Systems: SDG&E proposes to continue with application and system enhancements supporting records management.

Finally, SDG&E developed the risk spend efficiency (RSE). The risk spend efficiency is a new tool that SDG&E developed to attempt to quantify how the proposed mitigations will incrementally reduce risk. The metric used to determine the risk spend efficiency of the mitigations was based on records management data, which evaluates the vulnerabilities facing SDG&E's records management practices and policies.

Risk: Records Management

1   Purpose

The purpose of this chapter is to present the mitigation plan of San Diego Gas & Electric Company (SDG&E or Company) for the risk of records management,[1] with a focus on electric operational records that potentially implicate safety. The records management risk involves the use of inaccurate or incomplete information that could result in the failure to (1) construct, operate and maintain SDG&E's system safely and prudently; or, (2) to satisfy regulatory compliance requirements. Due to the breadth of tasks associated with the management of records for the entire enterprise, this risk chapter focuses on the enterprise-wide systems and processes for the management of operational records and is not intended to be a comprehensive discussion of all records.

This risk is a product of SDG&E's September 2015 annual risk registry assessment cycle. Any events that occurred after that time were not considered in determining the 2015 risk assessment in preparation for this Report. While 2015 is used as a base year for mitigation planning, risk management has been occurring, successfully, for many years within the Company. SDG&E and Southern California Gas Company (SoCalGas) (collectively, the utilities) take compliance and managing risks seriously, as can be seen by the number of action taken to mitigate each risk. This is the first time, however, that the utilities have presented a RAMP Report, so it is important to consider the data presented in this plan in that context. Expenditures during 2015 for the baseline mitigations are provided; however, the utilities do not currently track expenditures in this way, so the baseline amounts are the best effort of each utility to benchmark both capital and operations and maintenance (O&M) costs during that year. The level of precision in process and outcomes is expected to evolve through work with the California Public Utilities Commission (Commission or CPUC) and other stakeholders over the next several General Rate Case (GRC) cycles.

The Commission has ordered that RAMP be focused on safety-related risks and mitigating those risks.[2] In many risks, safety and reliability are inherently related and cannot be separated, and the mitigations reflect that fact. Compliance with laws and regulations is also inherently tied to safety and the utilities take those activities very seriously. In all cases, the 2015 baseline mitigations include activities and amounts necessary to comply with the laws in place at that time. Laws rapidly evolve, however, so the RAMP baseline has not taken into account any new laws that have been passed since September 2015. Some proposed mitigations, however, do take into account those new laws.

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[1] SDG&E considers records management as the practice of managing the records of an organization throughout the records' life cycle; from the time of creation to their eventual disposal. This includes identifying, classifying, storing, securing, retrieving, tracking and destroying or permanently preserving records, and recently, includes traceability, verifiability, completeness and ready availability (*See, e.g.,* Decision (D.)11-06-017 at p. 19).
[2] D.14-12-025 at p. 31.

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

In addition, the risk assessment provided herein focuses on records pertaining to SDG&E's electric operational assets. SDG&E's gas operational records are addressed in the corresponding RAMP Records Management chapter for SoCalGas. This is primarily because many of the electronic applications for managing gas records, as well as some of the gas record-related initiatives, are implemented and maintained by SoCalGas. However, this chapter will capture SDG&E gas costs directly funded at SDG&E.

2 Background[3]

For safety and compliance purposes, SDG&E has implemented various recordkeeping controls for its system in accordance with, for example, the following:

- General Order (G.O.) 95 – Rules For Overhead Electric Line Construction
  - Rule 80.1 defines the record keeping requirement for the required inspection of joint-use poles.
  - Rule 44.2 defines the requirements for pole loading calculations and the records documenting the analysis. This directly influenced the creation of the current Pole Information Data System (PIDS) portal to SAP-Plant Maintenance (SAP-PM) for storing these records, and the link provided within the Geographical Information System (GIS) mapping system for accessing these records.
  - Rule 18 provides records requirements related to the resolution of safety hazards and G.O. 95 nonconformances, also referred to as corrective maintenance. These records were initially stored within the Distribution Inspection and Maintenance System (DIMS) system, which was recently replaced by the more robust SAP-PM system. The inclusion of Communication Infrastructure Providers (CIPs) to Rule 18 following the 2007 wildfires prompted the creation of the Telecommunications Equipment Asset Management System (TEAMS) portal to SAP-PM, providing CIPs with the pole information and data required for joint use applications.

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[3] The records management risk and associated scores were originally determined by the Financial Systems and Compliance department (Financial Systems) within the Controller's organization, because this organizational unit provides general policy oversight over all company records, including administrative records. During the evaluation and development of this risk discussion, however, SDG&E determined that operational and asset records are more likely to implicate safety than other records, such as administrative records, and shifted its focus to these operational records. Keeping in line with this focus, the risk was transitioned to the Electric Distribution organization, which has greater visibility and knowledge of operational or asset records. This narrative, mitigations and proposals focus primarily on records management as it pertains to key activities in the electric operations organization.

- G.O. 128 – Rules For Construction of Underground Electric Supply and Communication Systems
  - Rule 17.7 provides requirements and responsibility for records pertaining to the location of underground facilities.
- G.O. 165 – Inspection Requirements For Electric Distribution and Transmission Facilities
  - Section III and Section IV provide the records management requirements for the inspection and maintenance of electrical assets for distribution and transmission facilities, respectively. Additionally, Section III.D requires submittal of an annual report identifying the asset inspection work completed. Given the large amount of data records required to compile an accurate and comprehensive annual report, recent IT improvement projects have been completed or are in progress to facilitate the process.
- G.O. 166 – Standards for Operation, Reliability, and Safety During Emergencies and Disasters
  - Standard 11 requires annual reporting reflecting compliance with the G.O. and any modifications to the emergency plan.
- G.O. 174 – Rules for Electric Utility Substations
  - Section III provides requirements for substation inspection program records and reporting requirements.

There are also many CPUC decisions (e.g. D.16-01-008) and additional requirements around data and records management result from various CPUC directives and laws (e.g. Assembly Bill [AB] 1650). In addition to the existing rules, SDG&E must also comply with new or developing records management rules.

3   Risk Information

As stated in the testimony of Jorge M. DaSilva in the Safety Model Assessment Proceeding (S-MAP) Application (A.) 15-05-002, "SDG&E is moving towards a more structured approach to classifying risks and mitigations through the development of its new risk taxonomy. The purpose of the risk taxonomy is to define a rational, logical and common framework that can be used to understand, analyze and categorize risks." The Enterprise Risk Management (ERM) process and lexicon that SDG&E has put in place was built on the internationally-accepted IS0 31000 risk management standard. In the application and evolution of this process, the Company is committed to increasing the use of quantification within its evaluation and prioritization of risks. This includes identifying leading indicators of risk. Sections 3 through 9 of this plan describe the key outputs of the ERM process and resultant risk mitigations.

In accordance with the ERM process, Section 3 describes the risk classification, possible drivers and potential consequences of the Records Management risk.

3.1 Risk Classification

Consistent with the taxonomy presented by SDG&E and SoCalGas in A.15-05-002, SDG&E classifies this as a cross-cutting risk as shown in Table 1. This risk affects people and regulatory, and is a function of employee conduct and compliance.

Table 1: Risk Classification per Taxonomy

Risk Type	Asset/Function Category	Asset/Function Type
CROSS-CUTTING	PEOPLE REGULATORY	EMPLOYEE CONDUCT COMPLIANCE

3.2 Potential Drivers[4]

When performing the risk assessment for Records Management, SDG&E identified potential indicators of risk, referred to as drivers. These include but are not limited to:

- Insufficient training of employees
- Insufficient time or resources to devote to the appropriate records management practices
- Insufficient data back-up policies, procedures or processes

Subcategories of these potential drivers can include, for example, incomplete or incorrect records, delays in capturing asset data into records systems, enterprise systems issues, and failure of employees to follow procedures, processes or practices.

3.3 Potential Consequences

If one of the risk drivers listed above were to occur, resulting in an incident, the potential consequences of a reasonable worst case scenario could include:

- Severe harm to life and/or property;
- Regulatory fines / penalties; and
- Erosion of public confidence.

These potential consequences were used in the scoring of Records Management risk that occurred during SDG&E's 2015 risk registry process. See Section 4 for more detail.
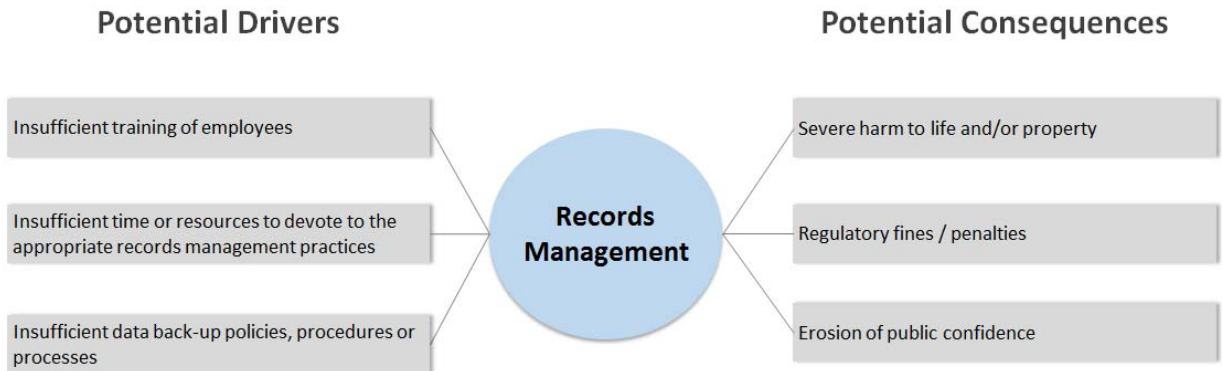
3.4 Risk Bow Tie

The risk "bow tie," shown below in Figure 1, is a commonly used tool for risk analysis. The left side of the bow tie illustrates potential drivers that lead to a risk event, and the right side shows the potential

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

310316

consequences of a risk event. SDG&E applied this framework to identify and summarize the information provided above.

Figure 1: Risk Bow Tie

4 Risk Score

The SDG&E and SoCalGas ERM organization facilitated the 2015 risk registry process, which resulted in the inclusion of Records Management as one of the enterprise risks. During the development of the risk register, subject matter experts (SMEs) assigned a score to this risk, based on empirical data to the extent it is available and/or using their expertise, following the process outlined in this section.[5]

4.1 Risk Scenario - Reasonable Worst Case

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

- Employees, relying on inadequate records, mismark the location of a natural gas pipeline, which ultimately leads to a pipeline failure. While this scenario relates to the potential failure of a gas facility, a similar scenario and consequences could occur with an electric facility, where inadequate records could lead to mismarking the location of a power pole or underground structure, ultimately leading to failure of the electrical equipment or structure. Both scenarios result in severe injuries and disruption of service for an extended period. This also results in a legal consequences including regulatory investigation with financial impacts.

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[5] SMEs from the Financial Systems as well as Gas and Electric Operations scored the Records Management risk.

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

4.2   2015 Risk Assessment

Using the scenario in 4.1, SMEs then evaluated the frequency of occurrence and potential impact of the risk using SDG&E's 7X7 Risk Evaluation Framework (REF). The framework (also called a matrix) includes criteria to assess levels of impact ranging from Insignificant to Catastrophic and levels of frequency ranging from Remote to Common. The 7X7 framework includes one or more criteria to distinguish one level from another. The Commission adopted the REF as a valid method to assess risks for purposes of this RAMP.[6] Using the levels defined in the REF, the SMEs applied empirical data to the extent it is available and/or their expertise to determine a score for each of the four residual impact areas and the frequency of occurrence of the risk.

Table 2 provides a summary of the Records Management risk score in 2015. This risk has a score of 4 or above in the Health, Safety, and Environmental impact area and, therefore, was included in the RAMP. These are residual scores because they reflect the risk remaining after existing controls are in place. For additional information regarding the REF, please refer to the RAMP Risk Management Framework chapter within this Report.

Table 2: Risk Score

Residual Impact				Residual Frequency	Residual Risk Score
Health, Safety, Environmental (40%)	Operational & Reliability (20%)	Regulatory, Legal, Compliance (20%)	Financial (20%)		
5	5	5	4	3	4,734

4.3   Explanation of Health, Safety, Environmental Impact Score

Applying the risk scenario of a pipeline, power pole, or underground equipment or structure failure (described in Section 4.1), SDG&E anticipated that such an incident could result in many permanent or serious injuries to employees or the public. Accordingly, SDG&E scored Records Management a 5 (extensive) in the Health, Safety, and Environmental impact in 2015.

4.4   Explanation of Other Impact Scores

Based on the selected reasonable worst case risk scenario, SDG&E gave the other residual impact areas:

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[6] D.16-08-018 Ordering Paragraph 9.

- **Operational and Reliability:** SDG&E rated the Operational and Reliability impact area a 5 (extensive). A serious incident could result in an interruption of service for greater than 10 days and may impact a large number of customers.
- **Regulatory, Legal, and Compliance:** SDG&E rated the Regulatory, Legal, and Compliance impact area a 5 (extensive) because of the potential for investigations and enforcement actions by the Commission and/or other local, state and federal government agencies that could result in fines and penalties, restricted operations, or other potential remedies.
- **Financial:** SDG&E rated the Financial impact area a 4 (major) because SDG&E reasoned that the primary financial impact would be a result of potential litigation and/or penalties, followed by costs associated with injuries and property damage. SDG&E estimated a potential financial impact range between $10 million to $100 million resulting in SDG&E's score of 4.

4.5   *Explanation of Frequency Score*

SMEs used empirical data to the extent available and/or their expertise to determine that the likelihood of a records management related incident occurring that would result in many severe injuries to the public or employees was considered to be 3 (infrequent), which is defined in SDG&E's 7X7 matrix as having the potential to occur every 10-30 years in its service territory. SDG&E scored this as a 3 because Records Management incidents involving SDG&E's operational asset records are rare and are further mitigated by the Company's existing controls; at the same time, SDG&E recognizes that enhancements to the existing program can be employed.

5   Baseline Risk Mitigation Plan[7]

As stated above, Records Management risk has potential public safety, property, reliability, regulatory, and financial impacts. The 2015 baseline mitigations discussed below include the current evolution of the utilities' management of this risk. The baseline mitigations have been developed over many years to address this risk. They include the amount to comply with laws that were in effect at that time. SDG&E's baseline mitigation plan for this risk consists of four controls: (1) Administrative, (2) Training, (3) Operational Compliance and Oversight; and (4) Information Management Systems.

SMEs from Financial Systems, Enterprise Risk Management, Electric Transmission and System Engineering, Electric Distribution, and Gas Operations departments collaborated to identify and document the controls. These controls focus on safety-related impacts[8] (i.e., Health, Safety, and Environment) per guidance provided by the Commission in D.16-08-018[9] as well as controls and

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[7] As of 2015, which is the base year for purposes of this Report.

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

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

mitigations that may address reliability.[10] Accordingly, the controls and mitigations described in Sections 5 and 6 address safety-related impacts primarily, which for the Records Management risk focuses on records management of operational assets. Note that the controls and mitigations in the baseline and proposed plans are intended to address various Records Management risks, not just the scenario used for purposes of risk scoring.

1. Administrative

For this risk, the Administrative mitigation activities include SDG&E's administration of and adherence to its record management policy and practices, resources to manage records, internal audits, and records storage (retention).

SDG&E's records management policies include, but are not limited to, processes and systems containing records, definition and identification of records, organizational records (both paper and electronic) and document retention and disposal policy. The goal of records management policies and practices is to provide consistent responsibilities for records management, and to require the assignment of specific accountability for oversight and administration of records management.

SDG&E also has record coordinators across the company. These record coordinators manage records and related issues, and are based within each of their respective business areas. The purpose is to give each operational area day-to-day control over records for which it has responsibility and knowledge. While not their primary job function, the record coordinators work closely with Financial Systems to promote and support the Company's records policies and procedures. In effect, this means that the management of operational asset records is decentralized.

Sempra Energy's Audit Services (Internal Audit) group performs periodic audits to verify compliance with policies related to records management and retention. Historically, these audits have occurred approximately every three years.

Lastly, SDG&E uses physical storage space, both on-site and off-site, for records. SDG&E manages the records storage so that it complies with SDG&E's policies related to retention and disposal.

2. Training

SDG&E currently provides training on general records management concepts to all employees biennially. Because every employee has a part in records management for the Company,

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

310316

including administrative records, this training helps to provide guidance and reminders about SDG&E's policies and procedures. Additionally, throughout the year, the records management compliance team holds meetings with records management coordinators within the operational areas to provide additional guidance on records management activities. The training requirements include mandatory periodic training on the SDG&E record management policies and systems containing records, definition and identification of records, organizing records (both paper and electronic), among other topics.

3. Operational Compliance and Oversight

Within operations, SDG&E resources are specifically tasked with collecting, inputting, and managing data. For example, in the Electric Regional Operations (ERO) Department, daily asset inspection and maintenance, as part of the Corrective Maintenance Program (CMP), is one of the primary functions of the group and is required through CPUC General Order 165. Through the CMP, employees within ERO perform and document the inspection of thousands of overhead and underground electric assets, utilizing the appropriate work management and plant maintenance systems. Employees within ERO also generate and complete maintenance orders for any corrective maintenance work. These orders are created, managed, and completed within the respective work management systems, which in-turn are digitized within the electric GIS mapping system, based on the as-built documentation submitted. Projects and programs, including replacement and inspection programs (e.g. CMP), and their associated costs are largely captured in the RAMP risk chapter of Electric Infrastructure Integrity and Wildfire Caused by SDG&E Equipment (Including Third Party Pole Attachments). This chapter is focused instead on the compliance with records policy requirements.

The operational and procedural processes to comply with records retention and management policies are managed by each individual operational organization. In other words, currently, management of operational asset records is decentralized in order to give each operational department day-to-day control over records for which it has responsibility and expertise.

4. Information Management Systems

Information Management Systems (IMS) are the IT applications that support the management of information and, for purposes of this risk, the IT applications that support operational asset records management.

IMS provide employees and contractors system-attribute information. These attributes include, but are not limited to, design, materials, construction methods, equipment or structure condition, and past and present operations and maintenance. This system information allows employees and contractors to complete their operational work safely and accurately. The IT applications

SDG&E uses to support records management include GIS, work management, document management, and operational monitoring systems among others.

6   Proposed Risk Mitigation Plan

The 2015 baseline mitigations outlined in Section 5 will continue to be performed in the proposed plan, in most cases, to maintain the current residual risk level. In addition, SDG&E proposes to enhance each of these mitigations as discussed below.

1. <u>Administrative</u>

As SDG&E continues to refine its records management program, SDG&E is proposing to hire third-parties or records management experts to provide feedback on its records management policies and practices. Specifically, as SDG&E attempts to benchmark against Generally Accepted Recordkeeping Principles (GARP) best practices, consultants may be able to assist SDG&E in determining common records management pitfalls or assist with best practices roadmaps. While the proposal for consultants is included in the administrative category, consultants may assist with any or all of the mitigation categories listed below.

2. <u>Training</u>

The current records management training occurs biennially. With increased focus on records management within the utility industry and a desire to further minimize risk exposure associated with safety, reliability, and other impacts, SDG&E proposes to provide annual training company-wide. Annual training will allow key records management concepts to be communicated to employees more frequently, to refresh employee knowledge and enhance employees' ability to more adequately prepare to manage records.

Due to industry incidents over the past several years, there is increased focus on operational asset records, specifically in the areas of accuracy, completeness, searchability, and traceability. While operating groups provide task-specific training internally as well as in areas such as design, asset inspection, maintenance, construction, and mapping, SDG&E believes additional training specific to operational asset records is a necessary mitigation to improve future risk reduction. The additional training specific to operational asset records management would be explicitly for those individuals within the operational organizations and is meant to be between 4-12 hours of additional training.

3. <u>Operational Compliance and Oversight</u>

SDG&E proposes to launch a centralized records management organization. This organization would provide operational oversight for records management processes in specific operational areas and would provide dedicated full-time records management over the daily tasks and activities performed. In essence, records management specialists representing each functional area within

the electric engineering and operations groups would serve as eyes and ears of the centralized operational records management organization and be a bridge to provide real-time feedback on continual improvement of SDG&E's records-related programs. The centralized records management organization proposed would also allow SDG&E to further review modernization of records while additionally identifying other potential opportunities to improve its records management program and oversight on day-to-day activities. With a centralized organization, SDG&E could more nimbly respond to and implement new and proposed regulations related to records management.

In order to launch this records management organization, SDG&E anticipates needing an additional 5 to 15 employees who would effectively be records management specialists; at a minimum, one manager to oversee the team and 1-3 individuals for each functional area (planning, engineering, design, construction, field operations, switching, mapping, etc.). These resources would be in addition to Financial Systems.

4.   Information Management Systems

While there are several current and planned IT applications and enhancements to support records management, SDG&E proposes an initiative to further digitize its records. SDG&E's records have evolved over the life of the operational assets, and transferring existing paper records to an electronic format (digitization) is one aspect of modernizing SDG&E's records. In addition to digitization, SDG&E's initiative will also add searchability and traceability functionality. Regulatory compliance standards increasingly require that utilities be able to efficiently and effectively identify specific attributes related to operational assets. As a result, having IT applications for records management that enable searchability and traceability functionality are important.

SDG&E has identified IT solutions to support the modernization effort. The intent of these projects is to leverage existing investments in information technology while providing improved functionality to address operational needs in the records management area.

7   Summary of Mitigations

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

SDG&E does not account for and track costs by activity, but rather, by cost center and capital budget code. So, the costs shown in Table 3 were estimated using assumptions provided by SMEs and available accounting data.

Table 3: 2015 Risk Mitigation Plan[11]
(Direct 2015 $000)[12]

ID	Control	Risk Drivers Addressed	Capital (Electric)[13]	O&M (Electric)	Capital (Gas)[14]	O&M (Gas)	Control Total[15]	GRC Total[16]
1	Administrative	• Insufficient training of employees • Insufficient data back-up policies, procedures or processes	n/a	$580	n/a	n/a	$580	$580
2	Training*	• Insufficient training of employees	n/a	30	n/a	0	30	30
3	Operational Compliance and Oversight*	• Insufficient training of employees • Insufficient data back-up policies, procedures or	6,250 (GRC) 1,110 (FERC)	4,710 (GRC) 350 (FERC)	n/a	600	13,020	11,560

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[11] Recorded costs were rounded to the nearest $10,000.

[12] The figures provided in Table 3 and 4 are direct charges and do not include Company overhead loaders, with the exception of vacation and sick. These costs are also in 2015 dollars and have not been escalated to 2016 amounts.

[13] Pursuant to D.14-12-025 and D.16-08-018, the Company is providing the "baseline" costs associated with the current controls, which include the 2015 capital amounts. The 2015 mitigation capital amounts are for illustrative purposes only. Because projects generally span several years, considering only one year of capital may not represent the entire mitigation.

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

[15] The Control Total column represents the total amount, which includes GRC items as well as any applicable non-GRC items.

[16] The GRC Total column is only presenting those costs which are typically represented in a GRC.

ID	Control	Risk Drivers Addressed	Capital (Electric)[13]	O&M (Electric)	Capital (Gas)[14]	O&M (Gas)	Control Total[15]	GRC Total[16]
		processes						
4	Information Management Systems*	• Insufficient data back-up policies, procedures or processes	16,830	n/a	2,730	n/a	19,560	19,560
	TOTAL COST		$24,190	$5,670	$2,730	$600	$33,190	$31,730

* Includes one or more mandated activities

Table 4 summarizes SDG&E's proposed mitigation plan and associated projected ranges of estimated O&M expenses for 2019, and projected ranges of estimated capital costs for the years 2017-2019. It is important to note that SDG&E is identifying potential ranges of costs in this plan and is not requesting funding approval. SDG&E will request approval of funding in its next GRC. There are non-CPUC jurisdictional mitigation activities addressed in RAMP; the costs associated with these will not be carried over to the GRC.

Table 4: Proposed Risk Mitigation Plan[17]
(Direct 2015 $000)

ID	Mitigation	Risk Drivers Addressed	2017-2019 Capital (Electric)[18]	2019 O&M (Electric)	2017-2019 Capital (Gas)[19]	2019 O&M (Gas)	Mitigation Total[20]	GRC Total[21]
1	Administrative	• Insufficient training of employees • Insufficient data back-up policies, procedures or processes	n/a	$700 - 990	n/a	n/a	$700 - 990	$700 - 990
2	Training*	• Insufficient training of employees	n/a	400 - 1,200	n/a	40 - 110	440 - 1,310	440 - 1,310
3	Operational Compliance and Oversight*	• Insufficient training of employees • Insufficient data back-up policies, procedures or processes	18,860 - 22,630 (GRC) 4,060 - 4,880 (FERC)	6,210 - 7,450 (GRC) 350 - 420 (FERC)	n/a	910 - 1,100	30,390 - 36,480	24,980 - 31,170
4	Information Management Systems	• Insufficient data back-up policies, procedures or processes	63,350 - 76,020	n/a	5,960 - 7,150	n/a	69,310 - 83,170	69,310 - 83,170

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[17] Ranges of costs rounded to the nearest $10,000.

[18] The capital presented is the sum of the years 2017, 2018, and 2019 or a three-year total. Years 2017, 2018 and 2019 are the forecast years for SDG&E's Test Year 2019 GRC Application.

[19] The capital presented is the sum of the years 2017, 2018, and 2019 or a three-year total. Years 2017, 2018 and 2019 are the forecast years for SDG&E's Test Year 2019 GRC Application.

[20] The Mitigation Total column represents the total amount, which includes GRC items as well as any applicable non-GRC items.

[21] The GRC Total column is only presenting those costs which are typically represented in a GRC.

310316

	TOTAL COST		$86,270 - $103,530	$7,660 - $10,060	$5,960- $7,150	$950- $1,210	$100,840- $121,950	$95,430 - $116,640

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

The mitigations and costs presented in Tables 3 and 4 mitigate the risk of Records Management. Some of the activities also mitigate other risks presented in this RAMP Report. For example, Catastrophic Damage Involving Third Party Dig-Ins (Dig-Ins) included GIS-related costs. Because this activity mitigates Records Management as well as Dig-Ins, the costs and risk reduction benefits are being included in all applicable RAMP chapters.

1. Administrative
   This mitigation has an uncertain range of costs. The costs will depend on whether a third-party consultant is hired and how much time will be needed by that consultant to assess and provide recommendations to SDG&E's records management policies and practices.

2. Training
   The cost to increase the frequency of the current records management training from biennially to annually is estimated to be $30,000 per year. The additional training specific to operational asset records management would be between 4-12 hours of additional training for operational employees, with an estimated cost of $400,000 - $1,200,000 annually.

3. Operational and Compliance Oversight
   As mentioned in Section 6, SDG&E's proposed hybrid records management organization would consist of additional 5 to 15 employees. The expected cost of these additional resources is $1,500,000 annually.

4. Information Management Systems
   To support SDG&E's modernization efforts, the proposed applications are estimated to be $70,000,000 in 2017 through 2019.

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8   Risk Spend Efficiency

Pursuant to D.16-08-018, the utilities are required in this Report to "explicitly include a calculation of risk reduction and a ranking of mitigations based on risk reduction per dollar spent."[22] For the purposes of this Section, Risk Spend Efficiency (RSE) is a ratio developed to quantify and compare the effectiveness of a mitigation at reducing risk to other mitigations for the same risk. It is synonymous with "risk reduction per dollar spent" required in D.16-08-018.[23]

As discussed in greater detail in the RAMP Approach chapter within this Report, to calculate the RSE the Company first quantified the amount of Risk Reduction attributable to a mitigation, then applied the Risk Reduction to the Mitigation Costs (discussed in Section 7). The Company applied this calculation to each of the mitigations or mitigation groupings, then ranked the proposed mitigations in accordance with the RSE result.

8.1   General Overview of Risk Spend Efficiency Methodology

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

8.1.1   Calculating Risk Reduction

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

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

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[22] D.16-08-018 Ordering Paragraph 8.

[23] D.14-12-025 also refers to this as "estimated mitigation costs in relation to risk mitigation benefits."

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

4. **Calculate the risk reduction (change in the risk score).** Using the methodology in Step 3, the Company determined the change in the risk score by using one of the following two approaches to calculate a Potential Risk Score: (1) for current controls, a Potential Risk Score was calculated that represents the increased risk score if the current control was not in place; (2) for incremental mitigations, a Potential Risk Score was calculated that represents the new risk score if the incremental mitigation is put into place. Next, the Company calculated the risk reduction by taking the residual risk score (See Table 2 in this chapter.) and subtracting the Potential Risk Score. For current controls, the analysis assesses how much the risk might increase (i.e., what the potential risk score would be) if that control was removed.[24] For incremental mitigations, the analysis assesses the anticipated reduction of the risk if the new mitigations are implemented. The change in risk score is the risk reduction attributable to each mitigation.

8.1.2   Calculating Risk Spend Efficiency

The Company SMEs then incorporated the mitigation costs from Section 7. They multiplied the risk reduction developed in subsection 8.1.1 by the number of years of risk reduction expected to be realized by the expenditure, and divided it by the total expenditure on the mitigation (capital and O&M). The result is a ratio of risk reduction per dollar, or RSE. This number can be used to measure the relative efficiency of each mitigation to another.

Figure 2 shows the RSE calculation.

Figure 2: Formula for Calculating RSE

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

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

8.2   Risk Spend Efficiency Applied to This Risk

SDG&E analysts used the general approach discussed in Section 8.1, above, in order to assess the RSE for the Records Management risk. The RAMP Approach chapter in this Report provides a more detailed example of the calculation used by the Company.

SDG&E used the Maturity Model, which is a standard based on GARP developed by the ARMA International to identify and evaluate areas of records management risks. The Maturity Model is a

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

performance-based standard that allows the user to assess the maturity of its records management program.

SDG&E applied the Maturity Model to three different timeframes:

1. Ad Hoc: The level of maturity should SDG&E abandon its current efforts for records management (i.e., administrative, training, operational compliance and oversight, and IT systems).
2. Current 2015: The level of maturity as of 2015.
3. Incremental 2019: The level of maturity if incremental mitigations are implemented in 2019.

The Current Controls were analyzed as one group; the Incremental Mitigations were analyzed as one group, also. Using the maturity model, SDG&E estimated the resulting likelihood of occurrence of the reasonable worst case scenario as follows:

- If the Ad Hoc scenario is applied, there is a risk of one event approximately every 2 years.
- If the Current 2015 scenario is applied, there is a risk of one event approximately every 12 years.
- If the Incremental 2019 scenario is applied, there is a risk of one event approximately every 27 years.

This means that reverting from the 2015 level of maturity to the Ad Hoc level will likely represent an approximately 600% increase in risk. On the other hand, progressing from the 2015 level of maturity to the 2019 prediction will likely represent a 55% reduction in risk.

8.3   Risk Spend Efficiency Results

Based on the foregoing analysis, SDG&E calculated the RSE ratio for each of the proposed mitigation groupings. Following is the ranking of the mitigation groupings from the highest to the lowest efficiency, as indicated by the RSE number:
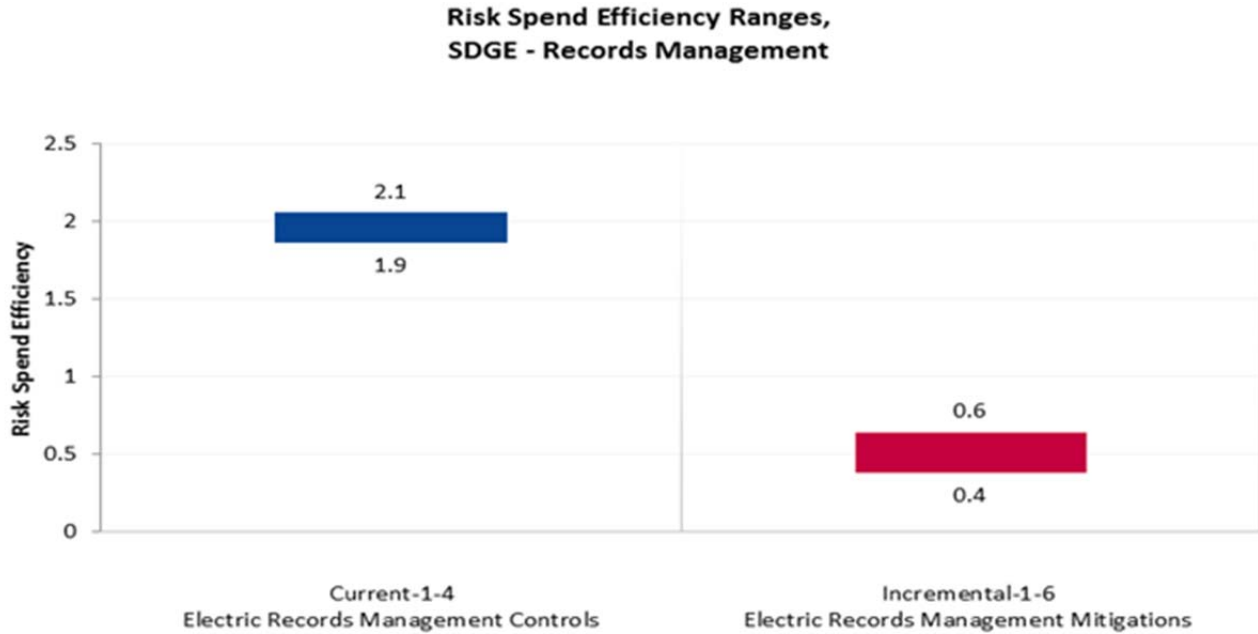
1. Electric Records Management Controls (current controls)
2. Electric Records Management Mitigations (incremental mitigations)

Figure 3 displays the range[25] of RSEs for each of the SDG&E Records Management risk mitigation groupings, arrayed in descending order.[26] That is, the more efficient mitigations, in terms of risk reduction per spend, are on the left side of the chart.

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[25] Based on the low and high cost ranges provided in Table 4 of this chapter.
[26] It is important to note that the risk mitigation prioritization shown in this Report, is not comparable across other risks in this Report.

Figure 3: Risk Spend Efficiency

Risk Spend Efficiency Ranges,
SDGE - Records Management

9   Alternatives Analysis

SDG&E considered alternatives to the proposed mitigations as it developed the incremental mitigation plan for the Records Management risk. The alternatives analysis for this risk plan also took into account modifications to the proposed plan and constraints, such as budget and resources, and included discussions with key stakeholders.

9.1   Alternative 1 – Maintaining Current Practices and Policies

A potential alternative to the proposals discussed above is to maintain the current records management program, including the risk mitigations in their current state. Although current mitigations are operating effectively, there may be areas that could be improved to further mitigate the risk and provide additional benefit. SDG&E intends to leverage a records management expert (consultant) to identify any potential areas of improvement. Additionally, SDG&E operations groups have identified specific areas for modernization of records. Maintaining the status quo may hinder these projects from moving forward.

9.2   Alternative 2 – Centralized IT Records Application

An alternative for IT applications is to implement one centralized records management IT system for all operational asset groups. This centralized system would replace all existing systems, like GIS, and replace with them with a single system. This alternative would minimize the potential for multiple systems to have differing records and may reduce costs since SDG&E could stop supporting many of its other IT applications. However, this alternative would also prevent each operational asset group from

identifying, implementing and utilizing a system that best meets the needs of the specific operational asset group. A one-size-fits-all approach that does not allow specialization because not all records require the same attributes to be collected and retained.

Further, inputting records can take considerable time and resources. SDG&E strives to create interfaces that allow its employees and contractors to quickly and efficiently input data into its systems. This is especially critical as it pertains to the accuracy and completeness of SDG&E's records. Additionally, an effort of this magnitude may cause a significant disruption to the existing records management process and may adversely impact the effectiveness of current mitigations. Therefore, this alternative was rejected in favor of the proposed plan.