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Commissioner	:	M Florio
Admin. Law Judge	:	Yip-Kikugawa
CPSD Project Mgr.	:	Robert Cagen

Consumer Protection and Safety Division
California Public Utilities Commission

Records Management within the Gas Transmission Division of Pacific Gas and Electric Company prior to the Natural Gas Transmission Pipeline Rupture and Fire, San Bruno, California September 9, 2010

San Francisco, California
March 5, 2012

Testimony of Paul Duller and Alison North

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CPSD will provide the footnote exhibits in electronic format on an external hard drive.

Soon reference documents associated with the recordkeeping OII will be available on the Commission website.
To access these documents, please visit
http://www.cpuc.ca.gov/PUC/events/110224_sanbruno.htm,
and search for the subject area called "Reference Documents for CPSD Reports in Recordkeeping Penalty Consideration Case".

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MEMORANDUM

This report was prepared by the Consumer Protection and Safety Division (CPSD) of the California Public Utilities Commission (CPUC). In this report the CPSD presents its analysis of the state of records management within the Gas Transmission Division of Pacific Gas and Electric Company prior to the Natural Gas Transmission Pipeline Rupture and Fire, San Bruno, California September 9, 2010.

Robert Cagen served as the CPSD project coordinator in this review. Darryl Gruen, CPSD counsel, was responsible for the overall coordination of the preparation of this report. The CPSD's witnesses' prepared qualifications and testimony are contained in Chapters 1-8 of this report.

1. Executive Summary

In its September 2011 final report[1] on the San Bruno pipe rupture and fire, the National Transportation and Safety Board (NTSB) concluded that "The multiple and recurring deficiencies in PG&E operational practices indicate a systemic problem" and that "PG&E's pipeline integrity management program, which should have ensured the safety of the system, was deficient and ineffective because it was based on incomplete and inaccurate pipeline information".

After the San Bruno rupture, the California Public Utilities Commission contracted various experts for an analysis and report on the reasons why the San Bruno pipe rupture had occurred. In June 2011 a panel of consultants, named the "Blue Ribbon" panel, released their report. The panel implicated recordkeeping deficiencies as one of the factors that led to the rupture.

This report details the findings of a more detailed strategic review of records management[2] activities within PG&E's Gas Transmission Division prior to the San Bruno pipeline rupture and fire on September 9, 2010. The report was commissioned by the California Public Utilities Commission (CPUC) and was undertaken by independent records management consultants, Dr Paul Duller and Alison North from the UK.

This report forms part of an investigation that was initiated on February 24th, 2011 by CPUC. This investigation set out to "determine whether the Pacific Gas and Energy Company (PG&E) violated any provision or provisions of the California Public Utilities code, Commission general orders or decisions, or other applicable rules or requirements pertaining to safety record-keeping for its gas services and facilities".[3]

This report contains a review and assessment of PG&E's policies, procedures, practices and records, as provided via data requests; technical reports, provided by the NTSB, CPUC and other third parties; interviews with PG&E staff; and, a series of site visits to PG&E's facilities. While this review focuses on organization, access, storage, preservation, and retention of Gas Transmission records and related documentation, the findings are also referenced against PG&E's corporate approach to records management.

This report finds that PG&E's pipeline records were widely distributed and poorly controlled across the Gas Transmission Division. On the basis of PG&E's own records catalog, we estimate that prior to the MAOP document consolidation project and before San Bruno, PG&E had stored its pipeline records for any given job in up to 10 different locations, without the necessary document control processes in place to track their location, existence or contents. To

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[1] National Transportation Safety Board. 2011. Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire, San Bruno, California, September 9, 2010. Pipeline Accident Report NTSB/PAR-11/01. Washington, DC, .pp. xi and 118

[2] For the purpose of this review, records management is defined as per Section 3.16 Part 1 of the ISO 15489 standard as the "field of management responsible for the efficient and systematic control of the creation, receipt, maintenance, use and disposition of records, including processes for capturing and maintaining evidence of and information about business activities and transactions in the form of records".

[3] CPUC Order Instituting Investigation number I.11-02-016.

illustrate just how dispersed their record keeping was, in respect of its pipeline-related information, we calculate that PG&E had:

- 12446 jobs with their job folders stored across 2 locations;
- 1711 jobs with their job folders stored across 3 locations;
- 293 jobs with their job folders stored across 4 locations;
- 45 jobs with their job folders stored across 5 locations;
- 8 jobs with their job folders stored across 6 locations;
- 4 jobs with their job folders stored across 7 locations;
- 1 job with their job folders stored across 10 locations.

This review has used the "Generally Accepted Record-keeping Principles®" (GARP®)[4] and the Information Maturity Model[5] defined by ARMA International[6] as the basis of an assessment and evaluation of PG&E's records management activities.

On the basis of the GARP® criteria we find that records management within PG&E's Gas Transmission Division prior to the San Bruno pipeline rupture and fire were '**Sub-Standard**'[7] (Average Maturity Score = 1.2).

While some elements of PG&E's records management activities, such as the creation of records retention policies received a slightly higher '**In-Development**'[8] rating (Maturity Score = 2.5), no elements were sufficiently developed to meet the '**Essential**'[9] minimum requirements (Maturity Score = 3) necessary to meet PG&E's legal and regulatory requirements.

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[4] www.arma.org/garp

[5] www.arma.org/garp/metrics.cfm

[6] ARMA International was previously known as Association of Records Managers and Administrators, and is the authority on managing records and information in the USA (www.arma.org)_

[7] **Level 1 (Sub-standard):** An environment where record-keeping concerns are either not addressed at all, or are addressed in a very ad hoc manner. Organizations that identify with these descriptions should be concerned that their programs will not meet legal or regulatory scrutiny.

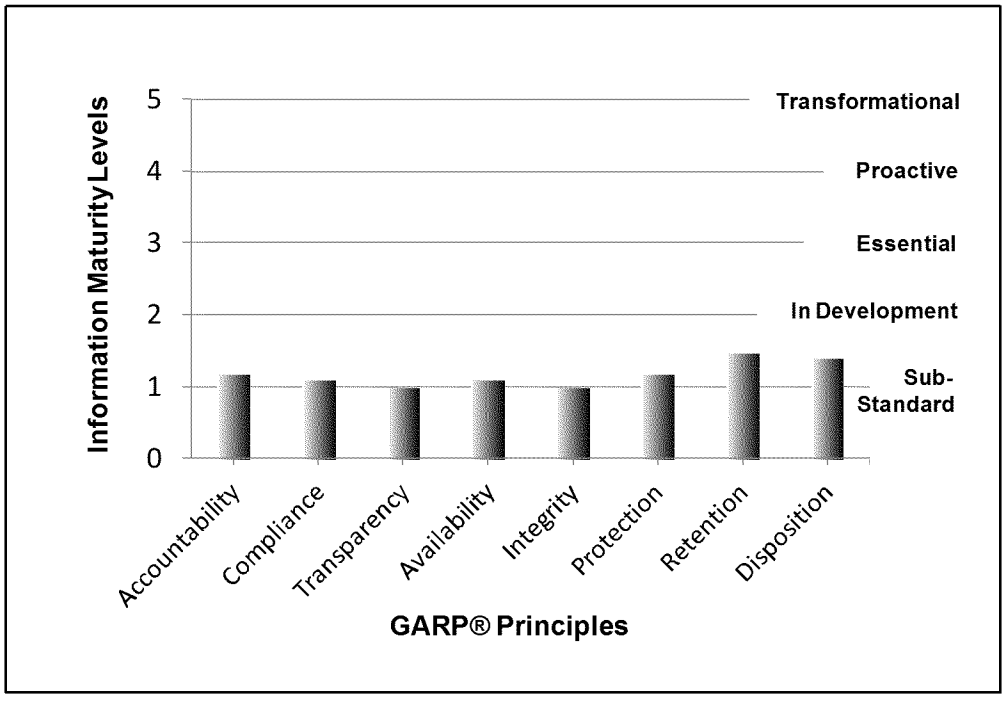
[8] **Level 2 (In Development): A**n environment where there is a developing recognition that record-keeping has an impact on the organization, and that the organization may benefit from a more defined information governance program. In Level 2, the organization is still vulnerable to legal or regulatory scrutiny since practices are ill-defined and still largely ad hoc in nature.

[9] **Level 3 (Essential):** The essential or minimum requirements that must be addressed in order to meet the organization's legal and regulatory requirements. Level 3 is characterized by defined policies and procedures, and more specific decisions taken to improve record-keeping.

Table 1-1: PG&E Gas Transmission Division's Information Governance Maturity prior to the San Bruno Pipeline Rupture and Fire

GARP® Assessment Criteria Records Management Theme	Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
Strategy	1.5	1.5	-	-	-	-	-	-
Responsibilities	1.5	1.5	1	1	1	1	1	1
Training	-	1	-	1	-	1	1	1
Policies, Standards, Procedures	1	-	-	2	-	-	-	-
Records Retention Policy	1.5	1	1	1	1	1	2.5	2
Business Continuity & Vital Records	-	1	-	-	1	2.5	-	-
Records Management Processes	1	1	1	1	1	1	1.5	1.5
Records Management Storage	1	1	1	1	1	1	1.5	1.5
Technology	1	1	1	1	1	1	1.5	1.5
Average Maturity Score (1-5)	1.2	1.1	1.0	1.1	1.0	1.2	1.5	1.4

Figure 1-1: PG&E's position on the GARP® Information Maturity Model



This review has identified a number of fundamental long-term issues which directly impacted the quality of records management within PG&E prior to the San Bruno pipeline rupture and fire. These include the lack of:

- A strategy for record management;
- Records management practices and processes that were verifiable, documented, communicated and available to all;
- Complete and accurate records of the organization;
- A level of protection that had appropriate access controls;
- A record-keeping program compliant with applicable laws and business requirements;
- The ability to accurately and efficiently retrieve their records in a timely manner;
- Education and training in records management available and compulsory for all staff;
- A secure and monitored disposal process with appropriate facility for 'legal holds'.

In lay terms, PG&E's recordkeeping was in a mess and had been for years. Gas transmission records and safety-related documents were scattered, disorganized, duplicated, and were difficult if not impossible to access in a prompt and efficient manner. The accuracy, completeness and quality of any of PG&E's digital datasets derived from its hardcopy pipeline records were at risk as PG&E did not have a complete and comprehensive master set of all job folders and files in one place that they could consult as they compiled their data. From the 1950's to date, PG&E has been aware of their legal records retention requirements. While they documented their legal requirements, their implementation of their retention standards was rather more subjective. In some instances, key record series, such as their pipeline history files were 'lost' or inadvertently destroyed.

The recordkeeping issues identified in this report could have been addressed if PG&E had put the right people, process and systems in place over time, and had provided clear records management guidance, direction with senior management support to improve the way that its different offices and teams manage their records and share information. The creation of a formal records management program with supporting records management policies, procedures, systems and training would have ensured that appropriate attention and protection was given to PG&E documents, so that the evidence and information they contain could have been retrieved more efficiently and effectively.

PG&E is already aware that significant changes are required in its records management and administrative practice in order to address operational requirements highlighted by previous NTSB and CPUC reports. PG&E has already admitted to this Commission that its pipeline recordkeeping was insufficient and has established a Pipeline Records Integration Program (PRIP) to address this matter. PG&E states that the objective of its PRIP is to "address the changing records management needs of PG&E's gas transmission business".[10] PG&E states

[10] R.11-02-019; PG&E's Direct Testimony on PG&E's Pipeline Safety Enhancement Plan (Implementation Plan), P. 5-7.

further that its "gas transmission business will need improved access to detailed information about the components making up the 6,761 miles of gas transmission pipe that have been installed over many decades".[11] PG&E has requested that $222.8 million of its Pipeline Records Integration Program (PRIP) costs be funded by ratepayers from 2012 to 2014. This request is composed of a Maximum Allowable Operating Pressure (MAOP) Records Validation Project and a Gas Transmission Asset Management (GTAM) Project.[12]

As consultants, we suggest that these costs are excessive, and we cannot support PG&E's request for them regardless of their total. The scope and degree of PG&E's proposals do, however, inform the Commission of the nature of the recordkeeping transformation and improvement that PG&E must undertake.

In summary, this report, and its findings and conclusions are consistent with the findings and conclusions of the NTSB, the Blue Ribbon Panel, and PG&E itself. Each may have reached its findings and conclusions based on different considerations and perspective. But each has concluded that PG&E's recordkeeping practices have been deficient and have diminished pipeline safety.

[11] Ibid.

[12] Ibid. P. 5-1.

2. Scope and Methods of Review

2.1. Scope of Review

The primary objective of this study was to provide a strategic review, analysis and assessment of the records management practices within the Gas Transmission Division of PG&E prior to the natural gas transmission pipeline rupture and fire in San Bruno, California September 9, 2010. In particular, this study set out to understand how PG&E's actual records and its records management systems, practices, standards and procedures related to the PG&E gas pipeline system had evolved since the installation of the pipeline; if they were consistent with applicable industry standards; and if an improved standard of care for record maintenance could have prevented the pipeline rupture and fire of September 9, 2010.

CPUC Commissioner Florio's Scoping Memo of November 21, 2011[13] designates that the first phase of this proceeding was to address past record-keeping practices. In order to ascertain exactly where documents were stored at the time of the incident, and understand the PG&E record-keeping practices and systems that were in place at that time, it was necessary for CPSD to also understand what document consolidation work had been undertaken since the San Bruno pipeline rupture and fire. Therefore, to that end we also examined PG&E's forward-looking MAOP validation efforts. In order to achieve the objective of the study, a review, analysis and assessment were undertaken of PG&E's records-related people, processes, technology and historical records (physical and electronic) from 1955 to the present day.

2.2. Method of Review

To address Commissioner Florio's scoping memo, and the OII itself, this study examines several things. First, the study compares PG&E records management activities with generally accepted record keeping principles, industry-specific and international standards, laws, regulations and resolutions and records management theory and practice in order to provide an overall picture of records management practices within PG&E prior to the Natural Gas Transmission Pipeline rupture and fire, San Bruno, California September 9, 2010.

In order to understand PG&E's historical records management processes and comment upon them, this report also examines the PG&E policies and standard practices that were in place from the 1950s to 2010, and the historical records and metadata that still existed within PG&E's files.

[13] I.11-02-016, "Order Instituting Investigation on the Commission's Own Motion into the Operations and Practices of Pacific Gas and Electric Company with Respect to Facilities Records for its Natural Gas Transmission System Pipelines", Assigned Commissioner's Scoping Memo and Ruling, November 21, 2011.

The report details the findings and observations based on:

- Published investigations and official reports of the San Bruno Pipeline rupture and fire;
- Interviews and observations with a cross-section and sample of PG&E leadership, management and staff, contractors and third-party service providers;
- A visual inspection of physical PG&E records storage conditions in PG&E offices, record stores and other facilities;
- A review of relevant records management infrastructure, programs, standards, policies and procedures (as provided via data requests);
- Site visits to PG&E storage facilities and offices, complemented by follow-up data requests to establish further details and identify areas contributing to the strategic direction of document and records management prior to the San Bruno incident;
- Technical reports, provided by the NTSB[14], CPUC and other third parties;
- A review of legislation, regulations and relevant CPUC Resolutions from 1913 to 2010;
- PG&E data responses to data requests;

The approach adopted was designed to identify 'gaps' in the document and records management service provision; to understand how records management had evolved over time; and to comment upon any impact that poor document and records management has had upon the organization and pipeline safety.

The scientific principle of parsimony (or Occam's razor) was followed in which we have tried to understand and explain the past by causes now in operation without inventing additional unknown causes, however plausible in logic, if the available processes would suffice to explain the result.

This report provides a strategic assessment of PG&E's Records Management activities and both compliments and supports the parallel investigation undertaken by Margaret Felts, a fellow member of the CPUC investigation team. In her testimony, Margaret Felts reports upon the engineering impact and implications of PG&E's record keeping practices at a tactical and operational level and explains how particular PG&E's record-keeping problems have caused engineering safety problems with gas transmission. This report focuses on more strategic and company-wide aspects of PG&E's record-keeping practices. The two CPSD reports overlap, at least in part, because the two subjects are closely related.

[14] National Transportation Safety Board. 2011. Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire, San Bruno, California, September 9, 2010. Pipeline Accident Report NTSB/PAR-11/01. Washington, DC.

3. Recordkeeping Standards Used In This Study

3.1. Introduction

This section introduces the assessment criteria we have used to benchmark PG&E's record-keeping practices from 1955 to 2010. We have included the international standards organization ISO15489-1:2001, the recognized standard for all record-keeping practices, developed and used by records management professionals in the USA and worldwide; ARMA International's[15] Generally Accepted Record-keeping Principles®[16] (GARP®) and Information Governance Maturity Model,[17] widely adopted by records managers in the USA; and, engineering and pipeline standards and guidelines that include record-keeping practices that are directly relevant to PG&E gas safety. These standards are explained in this chapter.

We also included in our assessment the comments from the NTSB report[18] that refer to the records not being traceable, verifiable or complete as an indication of the standard of record-keeping within PG&E at the time of the San Bruno pipeline rupture and fire. This records management review also included standards that while not directly categorized as general records keeping standards, are directly relevant to PG&E gas safety and gas safety record-keeping. We screened various standards and regulations from 1950s to 2010 including ASA B31.1–Power Piping, Title 49 CFR part 192 Transportation; Title 18 CFR part 125 Conservation of Power and Water Resources and CPUC Resolutions FA570 and A4691. These standards are referenced periodically throughout the text. Our assessment charts and comments are included in section 6, within the findings, and summarized in section 7.

3.1.1. ISO 15489-1:2001

ISO15489 is the International Standard for Records (information and documentation) management. It establishes the basis of 'One best Way' to undertake records management and it explains what any organization needs to know about records and records keeping; designing records systems; the key records management processes and controls; and the training and monitoring required. This standard states the principles that "records are a corporate asset" and acknowledges that companies exist in a highly regulated environment, and by inference, they have to keep records which are traceable, verifiable and complete. The standard is very practical in that it suggests ways of developing policies, procedures and practices to meet business needs and how they can be used to support other initiatives. It demonstrates how records management can be used to support the organization's aims and objectives; shows how Records Management underpins information asset management; and defines the benefits to be gained from such a program. This standard provides a useful point of reference for this study as it underpins and

[15] www.arma.org

[16] www.arma.org/garp

[17] ibid.

[18] National Transportation Safety Board. 2011. Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire, San Bruno, California, September 9, 2010. Pipeline Accident Report NTSB/PAR-11/01. Washington, DC.

supports most, if not all of the GARP principles. However, the ISO standard itself was not used directly in the measurement of PG&E's records management activities.

3.2. Criteria Used to Measure PG&E's Records Management[19]

A definitive set of eight Generally Accepted Record-keeping Principles® (GARP®) identify the critical hallmarks of information governance - an accountability framework that "includes the processes, roles, standards, and metrics that ensure the effective and efficient use of information in enabling an organization to achieve its goals."[20] The GARP® principles are used in this study as the benchmarking tool to assess the maturity of PG&E records management. Each of the GARP® Principles[21] is summarized below.

Principle of Accountability:[22] An organization assigns a senior executive who will oversee a record-keeping program and delegate program responsibility to appropriate individuals. The organization adopts policies and procedures to guide personnel, and ensure the program can be audited.

Principle of Transparency:[23] The processes and activities of an organization's record-keeping program are documented in a manner that is open and verifiable and is available to all personnel and appropriate interested parties.

Principle of Integrity:[24] A record-keeping program shall be constructed so the records and information generated by or for the organization have a reasonable and suitable guarantee of authenticity and reliability.

Principle of Protection:[25] A record-keeping program shall be constructed to ensure a reasonable level of protection to records and information that are private, confidential, privileged, secret, or essential to business continuity.

Principle of Compliance:[26] The record-keeping program shall be constructed to comply with applicable laws and other binding authorities, as well as the organization's policies.

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[19] These criteria are called the Generally Accepted Record-keeping Principles®

[20] The GARP® standards have been published by ARMA International, previously known as Association of Records Managers and Administrators, the authority on managing records and information. Formed in 1955, ARMA International is the oldest and largest association for the information management profession with a current international membership of more than 10,000. It provides education, publications, and information on the efficient maintenance, retrieval, and preservation of vital information created in public and private organizations in all sectors of the economy. The eight GARP® principles represent the collective knowledge and experience of many years of accepted best records management practices. As such, they apply to all sizes of organizations, in all types of industries, and in both the private and public sectors. The guidelines can be used by records management professionals to establish consistent practices across a variety of business units, or design comprehensive and effective records management programs; and by legislators in crafting legislation meant to hold organizations accountable.

[21] http://www.arma.org/garp

[22] http://www.arma.org/garp/metrics-accountability.cfm

[23] http://www.arma.org/garp/metrics-transparency.cfm

[24] http://www.arma.org/garp/metrics-integrity.cfm

[25] http://www.arma.org/garp/metrics-protection.cfm

Principle of Availability:[27] An organization shall maintain records in a manner that ensures timely, efficient, and accurate retrieval of needed information.

Principle of Retention:[28] An organization shall maintain its records and information for an appropriate time, taking into account legal, regulatory, fiscal, operational, and historical requirements.

Principle of Disposition:[29] An organization shall provide secure and appropriate disposition for records that are no longer required to be maintained by applicable laws and the organization's policies.

There is a link between the specific GARP® principles defined above and other quality metrics used by other bodies to assess PG&E activities. The GARP® principles of Compliance, Availability and Integrity are directly related to the three National Transportation Safety Board (NTSB)[30] documentation quality criteria cited in their reports and urgent safety recommendations (i.e. Traceable, Verifiable, and Complete), in that an increase/decrease in one or more of the NTSB parameters would result in a corresponding increase/decrease in the GARP® Integrity value. The remaining GARP® principles of Accountability, Transparency, Retention, Protection, Security, and Disposition, while still important to the records management process, have a more indirect and convoluted link with these parameters. The relationship between GARP criteria and NTSB documentation quality criteria is illustrated in Table 2.1 overleaf.

(continued from previous page)

[26] http://www.arma.org/garp/metrics-compliance.cfm

[27] http://www.arma .org/garp/metrics-availability.cfm

[28] http://www.arma.org/garp/metrics-retention.cfm

[29] http://www.arma.org/garp/metrics-disposition.cfm

[30] National Transportation Safety Board. 2011. Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire, San Bruno, California, September 9, 2010. Pipeline Accident Report NTSB/PAR-11/01. Washington, DC.

Table 2.1: The Relationship between GARP® and the NTSB Quality Criteria

	NTSB Criteria		
GARP Criteria	**Traceable**	**Verifiable**	**Complete**
Accountability	In-Direct	In-Direct	In-Direct
Compliance	Direct	Direct	Direct
Transparency	In-Direct	In-Direct	In-Direct
Availability	Direct	Direct	Direct
Integrity	Direct	Direct	Direct
Retention	In-Direct	In-Direct	In-Direct
Protection	In-Direct	In-Direct	In-Direct
Security	In-Direct	In-Direct	In-Direct
Disposition	In-Direct	In-Direct	In-Direct

3.2.1. Explanation of the Range of Scores That Apply to Records Management[31]

ARMA International has established a Maturity Model for Information Governance based upon the eight GARP® Principles and a solid foundation of standards, best practices, and legal/regulatory requirements. The ARMA Maturity Model defines 5 levels of record-keeping activity as:

Level 1 (Sub-standard): This level describes an environment where record-keeping concerns are either not addressed at all, or are addressed in a very ad hoc manner. Organizations that identify primarily with these descriptions should be concerned that their programs will not meet legal or regulatory scrutiny.

Level 2 (In Development): This level describes an environment where there is a developing recognition that record-keeping has an impact on the organization, and that the organization may benefit from a more defined information governance program. However, in Level 2, the organization is still vulnerable to legal or regulatory scrutiny since practices are ill-defined and still largely ad hoc in nature.

Level 3 (Essential): This level describes the essential or minimum requirements that must be addressed in order to meet the organization's legal and regulatory requirements. Level 3 is characterized by defined policies and procedures, and more specific decisions taken to improve

[31] These scores are also referred to as Information Governance Maturity details of which can be found at http://www.arma.org/garp.

record-keeping. However, organizations that identify primarily with Level 3 descriptions may still be missing significant opportunities for streamlining business and controlling costs.

Level 4 (Proactive): This level describes an organization that is initiating information governance program improvements throughout its business operations. Information governance issues and considerations are integrated into business decisions on a routine basis, and the organization easily meets its legal and regulatory requirements. Organizations that identify primarily with these descriptions should begin to consider the business benefits of information availability in transforming their organizations globally.

Level 5 (Transformational): This level describes an organization that has integrated information governance into its overall corporate infrastructure and business processes to such an extent that compliance with the program requirements is routine. These organizations have recognized that effective information governance plays a critical role in cost containment, competitive advantage, and client service.[32]

The ARMA Information Governance Maturity Model is used within the context of this study to provide a framework for the evaluation of PG&E's record-keeping programs and practices prior to the San Bruno pipeline rupture and fire. It has enabled us to quantify the information governance maturity of PG&E's Gas Transmission Division by comparing the Generally Accepted Record-keeping Principles® with the evidence compiled during the review. This approach also allows us to explain the detailed findings using the most common and widely accepted terminology for records management in the USA. Detailed level-by-level characteristics of each of the eight GARP® principles are presented in Appendix 2.

[32] http://www.arma.org/garp/metrics.cfm

4. Why Records Management Is Important

4.1. Overview

This section provides a brief introduction to the principles of Records management in order to establish a baseline for this review. While records have been kept for many thousands of years, the discipline of Records management originated in the early days of the British Empire when sailing ships were the only way to carry written communication between British colonies and London. Managing correspondence trails that could span years required a systemic approach to ensure that communication was recorded, managed in context with the subject at hand, and retained.[33] Today, records management continues to deliver value far beyond the visibility that it has in many organizations. It is inextricably tied to the governance of a business, its ability to operate legally, efficiently, and effectively, and provide traceable, verifiable and complete records. In the case of a utility transporting potentially flammable and explosive gas in pipes, good records management is vital to help achieve maximum safety.

Records management is a "professional management discipline that provides for well-structured record keeping system(s) to ensure quick and efficient access to complete, reliable, authentic and usable information when it is needed".[34] Records management is a specific corporate function that goes beyond the day-to-day administration and filing of records.[35] It manages complex processes created to control "the creation, receipt, maintenance, use and disposition of records, including processes for capturing and maintaining evidence of and information about business activities and transactions".

The guiding principle of records management is that "information must be readily available at the prerequisite time and in the form they are required".[36] Records management (RM) puts into place controls to manage the 'information lifecycle'.[37] These controls should form part of each and every process in the organization, they should assist staff to maintain accuracy and completeness, use effectively, share appropriately and then retain or dispose of records for which they are responsible. However, not all staff have a responsibility for the final outcome of every record they use, so the records management controls should show where the various responsibilities lie. Records management should provide guidance on techniques for filing, searching, retrieving and storing. The records management controls must also provide detailed and accurate information on records retention and disposition in terms of both business and legal requirements.

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[33] Progressing through the stages of records management competency, Business White Paper, Hewlett Packard (2009)

[34] M.F. Robek, G.F. Brown, D.O. Stephens, Information and records management: document based information systems, New York: Glencoe/McGraw Hill, 1995, p. 4.

[35] K. Smith, Planning and implementing electronic records management – a practical guide, London: Facet Publishing, 2007, p. 4.

[36] British Standards Institution, ISO 15489-1:2001, Information and documentation: records management: part 1: general, London: BSI, 2001, p .3.

[37] Managing the Information Lifecycle. http://www.jiscinfonet.ac.uk/infokits/information-lifecycle/Information-Lifecycle.pdf

Records management may not be the sole responsibility of an individual or a separate department therefore every member of staff should understand the principles, policies and controls that govern the maintenance, retention and disposition of their information, and be responsible for managing their information in accordance with the regulations and business requirements. The records management policy, the controls and the auditing to ensure that the controls are working and being used should be developed in line with other information-related policies such as information security, data protection and continuity. This should be part of an overall organizational information management strategy. A senior manager must be accountable for the development of the records management policies and controls and they must appoint someone to manage the process for retention and disposition of the records to ensure that through time those records that must be kept are complete, accurate, accessible, and secure. A more comprehensive overview of records management principles and practices is presented in Appendix 1.

4.2. Record Keeping Requirements Since 1912

PG&E should have been accustomed to record keeping requirements and compliance with standards since about the turn of the last century. Since October 10, 1912, the CPUC's General Order 28, required every public utility and common carrier under CPUC jurisdiction to "preserve all records, memoranda and papers supporting each and every entry (for) (a)ll records pertaining to depreciation and replacement of equipment and plant."[38] To emphasize the breadth of this requirement, the General Order further required that, "In the event that different titles, or designations, from those named above are used, the records or memoranda similar in character and purpose to those mentioned above, shall be preserved."[39] The Commission also set forth a requirement that each public utility keep its records well-organized and easily accessible, noting "the manner in which these records, memoranda and papers shall be preserved must be such that this Commission may readily examine the same at its convenience."[40]

[38] General Order 28, Approved September 10, 1912. Effective October 10, 1912, Reissued December 22, 1947.

[39] General Order 28, Approved September 10, 1912. Effective October 10, 1912, Reissued December 22, 1947.

[40] General Order 28, Approved September 10, 1912. Effective October 10, 1912, Reissued December 22, 1947.

5. The San Bruno Pipeline Rupture and Fire

5.1. Introduction

The National Transportation Safety Board produced a concise summary of the San Bruno Pipeline Rupture and Fire:

> "On September 9, 2010, about 6:11 p.m. Pacific daylight time, a 30-inch-diameter segment of an intrastate natural gas transmission pipeline known as Line 132, owned and operated by the Pacific Gas and Electric Company (PG&E), ruptured in a residential area in San Bruno, California. The rupture occurred at mile point 39.28 of Line 132, at the intersection of Earl Avenue and Glenview Drive. The rupture produced a crater about 72 feet long by 26 feet wide. The section of pipe that ruptured, which was about 28 feet long and weighed about 3,000 pounds, was found 100 feet south of the crater. PG&E estimated that 47.6 million standard cubic feet of natural gas was released. The released natural gas ignited, resulting in a fire that destroyed 38 homes and damaged 70. Eight people were killed, many were injured, and many more were evacuated from the area."[41]

5.2. Findings of the National Transportation Safety Board

The National Transportation Safety Board's investigation found that the rupture of Line 132 was caused by:

> "…a fracture that originated in the partially welded longitudinal seam of one of six short pipe sections, which are known in the industry as "pups." The fabrication of five of the pups in 1956 would not have met generally accepted industry quality control and welding standards then in effect, indicating that those standards were either overlooked or ignored. The weld defect in the failed pup would have been visible when it was installed." [42]

[41] National Transportation Safety Board. 2011. Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire, San Bruno, California, September 9, 2010. Pipeline Accident Report NTSB/PAR-11/01. Washington, DC. p. x.

[42] Ibid. P. x.

Following their investigation the National Transportation Safety Board concluded that PG&E's pipeline integrity management program, which should have ensured the safety of the system, was deficient and ineffective because it:

- Was based on incomplete and inaccurate pipeline information;
- Did not consider the design and materials contribution to the risk of a pipeline failure;
- Failed to consider the presence of previously identified welded seam cracks as part of its risk assessment;
- Resulted in the selection of an examination method that could not detect welded seam defects;
- Led to internal assessments of the program that were superficial and resulted in no improvements.[43]

Several deficiencies revealed by the National Transportation Safety Board investigation, such as PG&E's poor quality control during the pipe installation and inadequate emergency response, were also reported as factors in the 2008 explosion of a PG&E gas pipeline in Rancho Cordova, California,[44] and the 1981 PG&E gas pipeline leak in San Francisco,[45] which involved inaccurate record-keeping. The National Transportation Safety Board concluded that PG&E's multiple, recurring deficiencies were evidence of a systemic problem.[46] The National Transportation Safety Board investigation also determined that the California Public Utilities Commission (CPUC), the pipeline safety regulator within the state of California, failed to detect the inadequacies in PG&E's integrity management program and that the Pipeline and Hazardous Materials Safety Administration (PHMSA) integrity management inspection protocols need improvement.[47]

The National Transportation Safety Board determined that the probable cause of the accident was PG&E's inadequate quality assurance and quality control in 1956 during its Line 132 relocation project, which allowed the installation of a substandard and poorly welded pipe section with a visible seam weld flaw that, over time grew to a critical size, causing the pipeline to rupture during a pressure increase stemming from poorly planned electrical work at the Milpitas Terminal; and an inadequate pipeline integrity management program, which failed to detect and repair or remove the defective pipe section.[48] The National Transportation Safety Board also reported that contributing to the accident were the California Public Utilities Commission's (CPUC) and the U.S. Department of Transportation's exemptions of existing

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[43] Ibid at page xi.

[44] *Explosion, Release, and Ignition of Natural Gas, Rancho Cordova, California, December 24, 2008,* Pipeline Accident Brief NTSB/PAB-10/01 [Washington, DC: National Transportation Safety Board, 2010].)

[45] *Pacific Gas & Electric Company Natural Gas Pipeline Puncture, San Francisco, California, August 25, 1981,* Pipeline Accident Report NTSB/PAR-82/01 [Washington, DC: National Transportation Safety Board, 1982].)

[46] Ibid.

[47] Ibid. P. xi.

[48] Ibid. P. xii.

pipelines from the regulatory requirement for pressure testing, which should have detected the installation defects.[49] In response to the NTSB report, the CPUC initiated a number of actions, including the commissioning of this investigation (I.11-02-016).

5.3. PG&E's Response to the NTSB Report

5.3.1. The MAOP Verification and Validation Project

Following receipt of the NTSB report PG&E was ordered by the CPUC to conduct a project to validate its gas transmission pipeline maximum allowable operating pressure, known as the MAOP Verification and Validation Project. As no definitive catalog of its pipeline records was available to support the MAOP validation effort, PG&E's Gas Transmission Division initiated a major project to seek out, identify, consolidate and scan its pipeline-related job folder. To achieve this task PG&E employed teams of staff to hunt for job folders (the "T-Walk" team and the "D-Walk" team) across all of its 46+ offices. In addition, PG&E also undertook an extensive review of its hardcopy files that had previously been held at the Bayshore Records Center. In this instance, 1500 staff volunteers worked in shifts at the Cow Palace for five days to review over 100,000 boxes transferred from the Bayshore Records Center. While the 2011 Cow Palace project is outside of the primary time scale under review, it was necessary to reference in this exercise, as most of PG&E's local-office based record stores that existed prior to San Bruno were dismantled and their contents moved first to Cow Palace and then to Emeryville, as part of its MAOP project. The effort required PG&E to sift through these boxes and seek out pipeline-related information (approximately 7500 days or 30 staff years' worth of work) illustrates both the size and scale of the information access problem facing PG&E, even from within its own records store, and the historical lack of control place upon its own safety-critical pipeline records prior to San Bruno.

More comprehensive details of the three phases of the MAOP Verification and Validation Project phases are presented in Appendix 5. As part of the MAOP Verification and Validation Project and in furtherance of a company-wide conversion from paper to electronic record-keeping, PG&E is in the process of scanning all job file documents that can be used to verify and validate the MAOP for its transmission system. In the process, PG&E is creating in its electronic document management system (ECTS – see Chapter 6) as complete a list as possible of the jobs associated with the routes/lines. PG&E plans to migrate all of the scanned pipeline-related documents from ECTS to a permanent corporate repository. As part of its Pipeline Safety Enhancement Plan, PG&E also plans to implement a linear event-based GIS data model that leverages information from the existing geographical information system (GIS) and financial systems (SAP). The new GIS system should allow PG&E to view and analyze pipeline features, characteristics and event history relative to specific reference points along the entire length of gas transmission pipelines and host a comprehensive list of job files associated with PG&E's gas transmission system.

[49] Ibid. P. xii.

5.3.2. PG&E's Internal Review of Records Management

In 2011 PG&E commissioned the management consultancy group PwC, previously known as Pricewaterhouse Coopers to undertake an internal review of information management[50] within its Gas Transmission Division. As this study was not due to be completed until early March 2012, shortly after the submission of the CPSD's own report, a preliminary draft of the PwC findings was provided to CPSD as part of Data Request 25.[51] While a few of the issues identified in the PwC report have arisen in the aftermath of the San Bruno pipeline rupture and fire, many of the issues identified are as relevant to PG&E before San Bruno as they are today. A summary of PwC's key records management findings relating to the Gas Transmission Division from their draft report dated January 18, 2012, are presented in 8.2 Appendix 2. The PwC report, intended for internal PG&E use only, not only substantiates many of the findings of the CPSD investigation, as discussed in the following section, but also provides a damning indictment of the current state of information and records management within the PG&E Gas Transmission Division. CPSD understands that PG&E plans to make necessary changes to its records management processes based on the findings from the PwC assessment. These changes are likely to encompass new policies, procedures, practices, systems and improved training. The technology and systems that PG&E proposed to support their new record-management efforts are discussed in relation to the Gas Transmission Asset Management project ("GTAM") that forms part of the PG&E 2011 Pipeline Safety Enhancement Plan. This plan has requested over $222.8 million from ratepayers in order to address the pipeline-related data quality and records management issues identified by the NTSB in the original report.[52]

[50] Information in the context of this study encompasses all elements of records management, document management and data management.

[51] GasTransmissionSystemRecordsOII_DR_025-Q02(i) Supplement Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

[52] Further information on GTAM is provided in Chapter 5 of the Pipeline Safety Enhancement Plan, submitted on August 26, 2011, in Order Instituting Rulemaking 11-02-019.

6. Review Findings and Analysis

6.1. Introduction

As a result of our extensive efforts during the course of the recordkeeping investigation, we have come to believe that PG&E failed to maintain the records management practices necessary to promote the safety of its patrons, employees and the public. Examples of these failures include the lack of a company-wide strategy for record keeping; poor implementation of records management standard practices; inappropriate disposal of pipeline history files; inadequate management and control of job folders; poor metadata quality control; and the uncontrolled distribution, duplication and storage of pipeline-related job folders.

As a result of these failures: PG&E's historical pipeline records would not have been readily available, traceable, verifiable or complete; there was no single source of trusted pipeline-related documents records management was not optimized to support operations, decision making, planning or safety; and inconsistent, incomplete and out of date information would have been present in a significant number of its pipeline related job folders, as well as those systems, such as the GIS, which relied upon them.

This review has focused on PG&E's document and records management practices that directly impact the information necessary to keep PG&E's gas transmission pipelines safe. The findings section is subdivided into five major records management themes:

Section 6.2 - Records Management Strategy
Section 6.3 - Policies, Standards and Procedures
Section 6.4 - Records Management Processes
Section 6.5 –Records Storage
Section 6.6 - Technology

The review findings are discussed in relation to PG&E's record management practices and supported by both impact statements and Generally Accepted Record-keeping Principles (GARP®)[53] Information Maturity scores.

[53] http://www.arm.org/garp

6.2. Records Management Strategy

6.2.1. PG&E did not have a company-wide strategy for managing its records

Within PG&E there was no apparent company-wide strategy for managing records. There were Record Retention Standard Practices documents issued from the 1950s[54] up to the present day but there is no evidence of commitment to implement these standards; monitor or audit compliance with them; or train people to undertake the duties related to them. There was no structure, and few policies or procedures to allow records to be managed in a systematic and consistent manner across all of the business units/offices. PG&E appears to have evolved with a decentralized records management structure, with the responsibility for managing records residing firmly within each Division and undertaken locally by engineers and a number of document control clerks or their equivalent. The lack of control regarding how records were managed was a major source of risk for PG&E.

Since the San Bruno pipeline rupture and fire an Information Strategy is being developed by a new chief information officer (CIO) who has been brought in to help PG&E define and implement a new strategic vision for Information Management. Additional information management staff are being recruited and PG&E has commissioned Pricewaterhouse Coopers (PwC) to undertake a strategic review[55] of Information and Records management practices within the Gas Transmission Division. This review has already highlighted the: "lack of formal governance structure (roles and responsibilities), policies, and procedures relating to the management of records and information"; the existence of "informal or implied governance-centric practices"; and reports that there is "no true ownership and accountability of the lifecycle management of the records and information".

The impact of the above findings is presented in the impact statement in table 6-1 below, together with the respective GARP®[56] score for this section.

[54] Section 6.3 Policies, Standards and Procedures, of this report

[55] GasTransmissionSystemRecordsOII_DR_025-Q02(i) Supplement Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

[56] http://www.arma.org/garp

Table 6-1: Impact Statement: Strategy [57]

IMPACT – STRATEGY
Lack of a strategy to assign a senior officer to develop and deliver a records management program with policy, auditable process and guidance that support the objectives of the company, leaves PG&E exposed to: • **Lack of corporate governance and a failure to comply with legal and business requirements;** • **actual working practices failing to implement corporate policies;** • **Unaudited, subjective processes and procedures for managing records;** • **Staff untrained in records management principles and corporate governance requirements; and, Penalties and / or costs.**

GARP® Assessment Criteria – Strategy							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1.5	1.5	-	-	-	-	-	-

6.2.2. PG&E had no formal responsibility for Records Management activities in Gas Transmission Division

At the time of the San Bruno pipeline rupture and fire PG&E did not have a centralized records management function. However, there were a number of employees who were tasked with the management of specific gas records located in different areas of PG&E. This included: the Corporate Secretary's office; the Gas Transmission and Distribution Divisions; and the Engineering Records Unit. The Corporate Secretary's office was responsible for the management of PG&E's Records Center located in Bayshore, California. Until recently, the records center housed records from numerous PG&E Department's including some records belonging to the Gas Transmission Division.

PG&E reported that "certain individuals in the Gas Transmission Division have as their principal responsibility managing records, including gas transmission records[58]. Additionally, personnel in the Engineering Records Unit (ERU) scan, index and store engineering drawings from different lines of business, including gas. The ERU primarily supports the substation and Hydro generation groups.

Records Management responsibilities within PG&E's Gas Transmission Division appear diluted and confused. From the PG&E standard practices' documents provided in response to Data Request CPUC 25, no-one in the Gas Transmission Division had any formal responsibility for coordinating records management across all of that Division's different business units/offices. This is borne out by the statistics provided in Section 6.4.10. As such, different approaches were

[57] Based upon an assessment of compliance with the GARP® Principles, the GARP® Information Maturity Model and the authors' own professional experience.

[58] GasTransmissionSystemRecordsOII_DR_CPUC_025-Q02(f)

adopted by different parts of the business and local offices,[59] with varying degrees of success. PG&E's Records Center was, in the first instance established to retain inactive records from the General Office Departments. The Divisions',[60] instruction to transfer inactive records to the Records Center did not appear in the standard practices documents provided by PG&E until 1993.[61] It is possible then that all the records for the divisions remained with the divisions throughout their life with an ad-hoc approach to storing inactive files in the Records Center. PG&E's Internal Report[62] states that "processes do not necessarily address where information is collected, created, updated, shared between groups, stored in electronic systems, or disposed". This approach to central storage in the Records Center most likely driven by those staff who had specific responsibility for records within their job such as job clerks; document controllers; records management advisors; information sponsors. The last two on this list were identified in a number of the 210.4 standard practice series on record retention.[63]

Table 6-2: Impact Statement: Strategy (Responsibilities)

IMPACT – STRATEGY – Responsibilities
Lack of consistent and clear instruction to senior officers to ensure that they understand and deliver their actions within the records retention standard practices. This leaves PG&E exposed to: • **Incomplete and inconsistent process for disposition of records;** • **Inconsistent and un-followed methods for indexing, accessing, filing and storing records;** • **Time wasted re-inventing record-keeping processes;** • **Increased likelihood of more than one incomplete set of records being retained in different locations;** • **Inability to monitor compliance with the corporate standard practices and policies; and,** • **No knowledge as to who is responsible for record-keeping practices within the Division to comply with the PG&E company-wide Records Retention Standard Practices' requirements**

GARP® Assessment Criteria – Strategy – Responsibilities							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1.5	1.5	1	1	1	1	1	1

[59] See section 6.4 Records Management Processes section of this report

[60] Divisions that were also called Operating Regions in the later standard practices documents

[61] P2-210 (Chapter 2 and 2A) PG&E SP210.4-4 Retaining and Destroying Records – Operating Regions (01/02/1993)

[62] Gas Transmission System Records OII_DR_CPUC_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

[63] See section 8.3 Appendix 3

6.2.3. PG&E Had Several Deficiencies in Its Records Retention Responsibilities from 1948-2010

In response to Data Request 25 question 2, PG&E was not able to provide full details of the staff responsible for its record-keeping across the organization between 1948-1967 and only provided a list of 30 relatively junior staff who had some responsibility for the management of records between 1968 and 2010. Nonetheless, we compiled an extensive collection of excerpts from PG&E's record retention Standards Practices from 1951 to 2010, which show the responsible PG&E employees for internal record keeping, and their required actions, for example in 1951 General Office Department Heads and Division Managers were responsible for "supervision of the preservation and indexing of records"[64], and in 1986 Regional Managers were to "determine retention periods under requirements shown in the standard practice".[65]

With the passage of time and by 1998, PG&E's various internal documents seem to have downgraded responsibility levels and weakened action statements. In 1998, the responsibilities for ensuring that records were "retained as required by law",[66] belonged to a group of people called "Information Sponsors", with the Supervisor of Records administering the "Record Retention Program".[67] By October 2010 PG&E's latest standard, GOV7001S[68] scattered actions and processes across the various sections of the policy, and omitted any mention of auditing or monitoring

PG&E's more recent Standard Practice and policies were disorganized for several reasons. First, despite stating it is to be issued annually in September, the version presented to us in October 2011, was dated October 2010. Arguably, the most important document – the "PG&E Guide to Record Retention" listed as a supplemental reference; does not show a version number or date of issue; and seems not to be indexed under the Policy; Standard; Procedure or Bulletin regime explained in PG&E's guidance for documents known as GOV-2001S[69]. Referencing it in this manner would make it difficult to identify and find. Furthermore, attached to the back of the copy of GOV-7001S is an internet copy of Title 18: Conservation of Power and Water Resources. This attachment gives examples of records retention periods that are not directly related to those in the gas transmission division, but are pertinent to corporate records, tax and accounting. Therefore, this attachment should be in "USP4 Records Retention and Disposal

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[64] P2-191 (Chapter 2 and 2A Attachments) PG&E Circular letter EX642 Federal Power Regulations to Govern the Preservation of Records(05/17/1951)

[65] P2-205 (Chapter 2 and 2A Attachments) PG&E SP210.4-4 Retaining and Destroying Records – Operating Regions (06/01/1986)

[66] P2-216 (Chapter 2 and 2A Attachments) PG&E USP4 Utility Standard Practice – Record Retention and Disposal (10/22/1998)

[67] Ibid P2-216

[68] P2-4 and P2-233 (Chapter 2 and 2A Attachments) PG&E GOV7001S Record Retention and Disposal Standard (10/01/2010)

[69] P2-6 (Chapter 2 and 2A Attachments) - Extract explaining purpose of GOV2001S "This standard establishes an enterprise-wide framework for writing reviewing approving cancelling and communicating all guidance documents (unless documents are specifically exempted from this framework) issued by PGE Corporation and its affiliates and subsidiaries including Pacific Gas and Electric Company. This framework replaces all organization-specific document types templates and associated documentation establishing four common guidance document types (policies standards procedures and bulletins) that PGE organizations are to use"

Guidance for Transmission and Distribution (04/16/2010)". This appears to be the document that is referred to in GOV7001S as "Guide to Record Retention", but is not consistently named.[70]

In short, there appears to be a disconnect between the intent of these standards and the action required in the Gas Transmission Division to deliver a compliant records management program. Moreover, PG&E's Internal Report[71] states that "Document Retention Strategies (are) not aligned with GOV-7001S"[72]; "Education related to retention periods and retention schedules is not consistent and not well communicated"; and, "no formal process for record/document disposition is in place". The report highlights the fact that "records retention and policy related information is difficult to locate". In fact when the PG&E Intranet site and the Technical Information Library (TIL) search facilities were tested using the key PG&E Records Management Standard number "GOV7001S" no search results were returned even when various combinations of "GOV7001S" or "GOV7001" were run.

The collection of standard practices and guides, with extracts, referenced in section 6.2.3, is shown in Section 8.3, Appendix 3.

6.2.4. PG&E does not have an infrastructure that supports Knowledge, Training and Education in records management principles and practices

There is no infrastructure to provide staff with education and training in records management principles and practices. No mentoring, skills transfer, or support for staff that have record-keeping responsibilities within PG&E. While compliance and ethics training has been undertaken across all of PG&E, records management and retention and disposal training has not been provided to PG&E staff.

PG&E's Internal Report[73] on its Mapping staff, who have a major role in record creation and a need to understand how to manage records, states that "employees lack sufficient training on records retention requirements and processes"; "some employees are not aware of how long to keep specific records, where to find this information, or even if a records retention schedule exists"; and "most employees were unaware of the specific record retention guidelines as defined by GOV-7001S". The report highlighted the fact that "little to no effective training on widely used systems (SAP, GEMS, SharePoint, IGIS, ECTS)" was provided for the larger mapping group, and that "the existing mapping training program "MAP" contains modules that demonstrate outdated and obsolete techniques (ink and vellum) which are no longer as applicable to the day-to-day responsibilities of mapping and how they execute their work". The report also

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[70] P2-3(andP2-230) (Chapter 2 and 2A Attachments)USP4 Records Retention and Disposal Guidance for Transmission and Distribution Systems (04/16/2010)

[71] GasTransmissionSystemRecordsOII_DR_025-Q02(i) Supplement -Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

[72] P2-4 and P2-233 (Chapter 2 and 2A Attachments) PG&E GOV7001S Record Retention and Disposal Standard (10/01/2010)

[73] GasTransmissionSystemRecordsOII_DR_025-Q02(i) Supplement Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

highlights the "lack of consistency in how processes are designed and communicated, and how different groups across offices understand and are accountable for their roles as inputs into the eventual mapping of a job"; the "lack of standards in terminology and the use of forms across locations". This "lack of consistency" is illustrated in one office, where regulation drawings are done manually and updated by pencil rather than in CAD.

Table 6-3: Impact Statement: Strategy (Training)

IMPACT – STRATEGY – Training
Lack of any RM training, mentoring or support for staff with record-keeping responsibilities as well as all other staff leaves PG&E exposed to: • **Legal and Fiscal Penalties when staff dispose of records that are required to be retained;** • **Staff with no knowledge of RM Program and compliance requirements of the standard practices;** • **Vital Records being removed from office to home without controls;** • **Pockets of un-indexed legacy filing when staff leave; and,** • **Time wasting when staff don't know where and how to retrieve up-to date information.**

GARP® Assessment Criteria – Strategy - Training							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
-	1	-	1	-	1	1	1

6.3. Policies, Standards and Procedures

6.3.1. PG&E did not have a consistent framework for Policies, Standards and Procedures

PG&E did not have a consistent framework of policies, standards and procedures by which records should be managed across the organization.

The Corporate Retention Standard Practices documents, dated from 1951-2010, were provided by PG&E via their Chapter 2 response dated July 2011 and Data Request 25. PG&E provides an historical timeline and details about the way in which they managed records retention during the 60 year period. While the records retention standard practices were published via a corporate wide system, in an apparent attempt to deliver a records retention program, there is little evidence to support that the actions required in the standard practices' documents, were carried out in the divisions.

Reference to local record-keeping may be found in various other standards, specifications and local procedures provided by PG&E within the PG&E Chapters 2 and 2A response.[74] The legacy systems have been difficult to piece together because many documents moved to Cow Palace and then to Emeryville during a major document consolidation and transfer exercise as part of the MAOP Verification and Validation Project, after the San Bruno Pipeline Rupture and Fire. Further detailed findings on the legacy systems are contained in Section 6.4 of this report.

6.3.2. PG&E did not consistently follow Corporate and Operating Regions Procedures and Standards

The PG&E Records Management Program from the 1950s onwards, revolved around Standard Practice Document 210-4 series and was divided into sections 1 to 5. 210.4-4 related to Divisions, later referred to as Operating Regions, and ran in parallel with 210.4-3 General Office Departments which was updated at approximately the same time. The General Office Departments were mandated to use the Records Center from the early 1960s whereas the reference to use of the records center storage for Divisions did not seem to feature until 1993.

As a result of the movement of the documents to Cow Palace there is little evidence to support that the corporate standard 210.4-4 on retention in the Divisions was known about or being followed.[75] The depositions of previous PG&E staff (Larry Medina)[76] demonstrate that PG&E failed to maintain a consistent records management service during periods of organization change and that this was a contributing factor in the loss of PG&E's entire collection of historical pipeline information files.

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[74] PG&E Response Chapter 2 response July 12, 2011 –Index of Attachments - Relevant Standard Practices are footnoted throughout the report

[75] GasTransmissionSystemRecordsOII_DR_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

[76] "Telephonic Interview of Larry Medina"; Investigation of: Pacific Gas & Electric Company September 9, 2010 Accident San Bruno, California; Docket No.: DCA-10-MP-008; National Transportation Safety Board; June 27, 2011.

The 210.4 series of standards showed several things. First guidance on records management was focused on storage, archiving and document destruction. Second, in order to 'save money' guidance on records management was limited to removal of 'inactive' records with legal or business retention requirements to the Record Center. This was initially at the discretion of the General Office Departments' and later on Divisions' Heads.

PG&E's Internal Report[77] highlights the: "perceived lack of standards around processes and procedures results in inconsistencies around what information is included in job folders"; "lack of formal governance structure (roles and responsibilities), policies, and procedures relating to the management of records and information"; the existence of "informal or implied governance-centric practices"; and reports that there is "no true ownership and accountability of the lifecycle management of the records and information".

PG&E's Internal Report[78] states that there is a "lack of consistency in how processes are designed and communicated, and how different groups across offices understand and are accountable for their roles as inputs into the eventual mapping of a job". For example, "the mapping manual is outdated and does not include current standards. It has not been updated since the late 80s/ early 90s and does not incorporate the update bulletins that are now issued. Many mappers still retain old physical copies of the manual. While some Mappers have taken personal initiative to update their own manuals with new standards, most have not".

PG&E's Internal Report[79] notes also that "the standard process for scanning jobs into SAP is not consistently followed. Job folders scanned into SAP by RMC clerks may not be complete, do not always contain the final versions of documents, and may be unreadable or unusable, or not scanned at all". In addition it points out that "the process for closing out jobs is inconsistent at the Resource Management Center (RMC) and in the field locations"; "Each office has different ideas about whether the most accurate tracking for outstanding jobs comes from SAP, a spreadsheet maintained by the lead, or perhaps what arrives in an inbox".

PG&E's Internal Report[80] goes on to state that even today "related paper and electronic records can be difficult to locate from office to office because of "the unique process each office has created to ensure the Mappers have access to the information they need"; the "location and organization of physical records varies by location and is often only known to a few individuals performing the filing"; and additionally, that "maps are inconsistent between Gas Transmission and Gas Distribution, as well as between divisions". The lack of process and controls for field personnel submitting map corrections is cited, as a further cause for concern as "the map correction process varies by location", while the lack of controls over contractors, is cited for "completeness, consistency, and quality of work" issues.

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[77] GasTransmissionSystemRecordsOII_DR_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization , Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

[78] Ibid.

[79] Ibid.

[80] Ibid.

Table 6-4: Impact Statement: Policies, Standards and Procedures

IMPACT – STRATEGY - POLICIES, STANDARDS AND PROCEDURES
Lack of a consistent framework for RM Policies, Standards and Procedures and the inconsistent implementation of those that did exist, expose PG&E to: • **Lack of a company-wide, consistent approach to records management;** • **Inefficient access and retrieval of records;** • **Out of date laws, regulations, standards and resolutions being applied against the records;** • **Ignorance of the business needs to retain certain records;** • **Inconsistent methods for managing compliance with the retention standard practices;** • **Poor corporate governance**

GARP® Assessment Criteria – Strategy – Policies, Standards and Procedures							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1	-	-	2	-	-	-	-

6.3.3. Several of PG&E's Internal Record Retention Requirements Do Not Require PG&E to Keep Certain Records As Long As Certain Regulatory Retention Requirements

Some of PG&E's internal retention schedules require keeping certain types of records for shorter periods of time than certain other applicable regulatory requirements. In cases where PG&E's retention schedules do not require retention of records as long as other requirements, PG&E's minimal compliance with its own policies would constitute a violation of such requirements. Moreover, where different sources of authority require different minimum retention periods for the same type of record, it is standard practice across all organizations to keep these records long enough to meet the longest required retention period.

Five examples of this problem are apparent, that apply to leak survey maps; line patrol reports; line inspection reports; gas high pressure test records; and transmission line inspections, including patrol maintenance reports, trouble reports and line logs. Each of these examples is detailed within our analysis in Appendix 9 and discussed in order immediately below.

PG&E's Minimal Compliance with Some of Its Own Retention Policies Regarding Leak Survey Maps Violated Other Requirements: As of April 16, 2010, PG&E's mandated retention period for leak survey maps was only nine years. However, the ASME standard required keeping records such as leak survey maps for the life of the facility. Therefore, PG&E's disposal of leak survey maps in minimal compliance of its own policies did not comply with ASME standards as of April 16, 2010. Also, as of June 6, 1996, the CFR has consistently required operators to keep leak survey records for either five years or until the next leak survey record is made, whichever is greater. In all cases, the CFR policy means that a leak survey record must be retained until it is replaced with the next one.

In summary, by requiring only a minimum retention period of 9 years, PG&E's policy fails to establish that an existing leak survey map will be replaced with a new one. Practices that have followed this policy from April 16, 2010 to the present also violate the CFR.[81]

PG&E's Minimal Compliance with Some of Its Own Line Patrol Report Retention Policies Violated Other Requirements: PG&E's mandated retention period for line patrol reports, on September 1, 1964 was 1 year in the office and three years total. However, the relevant ASME standard from 1963,[82] section 851.5 required keeping records including line patrol reports for the life of the facility. Moreover, in 1994, 2005, and 2008, PG&E retention schedules required keeping line patrol reports for lines other than numbered gas transmission lines for only three years. However, the ASME standards required keeping all line patrol reports for the life of the facility continuously through 2010.[83] Therefore, PG&E's disposal of line patrol reports for any gas transmission lines, in minimal compliance with its own standard practices from 1994, 2005, or 2008, would have constituted violations of the ASME standards. Additionally, from 1970 to 1996, the CFR required keeping records such as line patrol reports for the life of the facility. Therefore, any disposal of a line patrol report by PG&E after only three years, in compliance with its 1964,[84] or 1994,[85] standard practices would have violated the CFR during this time. Moreover, beginning in 1996 and until today, the CFR required a record to be kept for five years or until a new line disposal report was made, whichever was greater. Therefore, any disposal of a line patrol report by PG&E after only three years, in minimal compliance with its May 2008 retention schedule, violated the CFR at this time.

In summary, PG&E's minimal compliance with its retention policies for line patrol reports other than numbered transmission lines violated ASME, the CFR, or both from September 1, 1964 to April 16, 2010.

PG&E's Minimal Compliance with Some of Its Own Line Inspection Report Retention Requirements Violated Other Requirements: PG&E's retention guidance documents from April 6, 1994, March 14, 2005 and May 22, 2008 each required that PG&E retain line inspection reports for gas transmission lines only three years. In contrast, ASME standards from 1955 to 2010 required keeping inspection records for the life of the facility. Also, by June 6, 1996, the CFR required keeping inspection records for five years or until the next line inspection report or records is made, whichever is greater.

In summary, from April 6, 1994 until the present, PG&E's minimal compliance with its internal policies would be violation of ASME and the CFR.

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[81] Throughout this section, and in the analysis spreadsheet in Appendix 9, CFR refers specifically to 49 CFR Section 192.

[82] This refers specifically to ASME Standards from Section B31.8.

[83] The full analysis spreadsheet is located in Appendix 9 of this report and testimony

[84] P2-195 (Chapter 2 and 2A) Retention Schedule for Records in the Divisions (09/01/1964)

[85] P2-212. (Chapter 2 and 2A) Guide to Retention of Company Documents (04/06/1994)

PG&E's Minimal Compliance with Some of Its Gas High Pressure Test Record Retention Policies Violated Other Requirements: PG&E's retention policies from April 6, 1994, March 14, 2005, and May 22, 2008 each required that PG&E retain gas high pressure test records for three years. However, from 1955 to 2010, ASME standards required keeping test pressure records showing procedures used and data developed in establishing MAOP for the life of the facility. Therefore, from April 6, 1994 until the present, PG&E's minimal compliance with its policies to keep any gas high pressure test pressure records that showed procedures used or data developed in establishing MAOP violated ASME requirements. In August 19, 1970, the CFR required that all pipelines operating at hoop stresses of 30% or more of SMYS, PG&E had to keep for the life of the facility records showing the operator's name, name of employee making the test, test medium used, test pressure, test duration, pressure recording charts or other record of pressure readings, leaks and failures noted and their disposition.

In summary, from April 6, 1994 until the present, PG&E's minimal compliance with its policies to keep any gas high pressure test records that showed any of these aforementioned things violated the CFR.

PG&E's Minimal Compliance with Some of Its Record Retention Policies of Transmission Line Inspections, Including Patrol Maintenance reports, Trouble Reports and Line Logs Violated Other Requirements: PG&E's retention policies from September 1, 1964, April 6, 1994, March 14, 2005 and May 22, 2008 each required that PG&E retain transmission line inspections, including patrol maintenance reports, trouble reports, and line logs. However, from 1955 to present, ASME standards required keeping such inspection records for the life of the facility. Moreover, from August 19, 1970 to June 5, 1996, the CFR required keeping such records for the life of the facility.

In summary, from September 1, 1964 until April 15, 2010, PG&E's minimal compliance with its own policies, and also its failure to keep these records for anything less than life of the facility violated ASME requirements, and also violated the CFR requirements from 1970 to 1996. In addition, from June 6, 1996 until the present, the CFR required these types of records to be kept for either five years or until the next line inspection report or record is made, whichever is greater. In all cases, this meant keeping such inspection records until a new one was made. Therefore, compliance with PG&E's policy would fail to produce a replacement transmission line inspection record, and violate this element of the CFR from June 6, 1996 until the present.

6.3.4. At all times between 1950 and 2010, PG&E was aware of the requirement to retain and maintain certain documents for various lengths of time but failed to implement their practices fully

At all times throughout the period 1950 to 2010 PG&E was aware of the requirement to retain and maintain specific types of documents for various lengths of time. With few exceptions, senior management was designated with the responsibility to comply. The PG&E retention practices from the 1950s to the mid-1990s revolved around a series of standard practices[86] containing references to Federal Power Commission, and later FERC Regulations, as well as CPUC Resolutions. While they documented their legal requirements within various guides to retention appended to the standard practices, the implementation of their retention standards was rather more subjective. In some instances, key record series, such as their pipeline history files were 'lost' or inadvertently destroyed during office moves.

Despite the need for compliance, few PG&E staff in the gas transmission division were aware of the detailed legal, regulatory, and fiscal records retention requirements, or PG&E standard which set out their roles and responsibilities in this respect. Recent evidence for this is presented in PG&E's Internal Report[87]. Despite the existence of PG&E's own retention standard, GOV-7001S, the report highlights the fact that PG&E's Gas Transmission Division lack(s) "formal governance structure, policies, and procedures relating to the management of records and information"; "education related to retention periods and retention schedules is not consistent and not well communicated". It also has "no formal process for record/document disposition is in place"; a "records retention and policy related information is difficult to locate"; and existing "Document Retention Strategies (are) not aligned with GOV-7001S".

In relation to its historical pipeline files PG&E did not comply with its own specific retention guidelines. For example, As of December, 1969, PG&E had an extensive standard practice that explicitly set forth requirements for establishing and maintaining pipeline history files. In particular, the standard practice required, "History records for numbered transmission lines shall be filed by line number, with all pertinent inclusions of data shown. . . indexed for ready reference, and cross-referenced to other permanent files, such as GM or Work Order files." It also required that "The complete pipeline and main history files shall be maintained up to date by the Division or department for the life of the operating facility."[88] In spite of having this standard practice, PG&E is now unable to account for its pipeline history files. PG&E now believes its entire collection of pipeline history files were destroyed in the Mid 1990's, despite being alerted to their importance by Larry Medina.[89]

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[86] Table 8.4 section 8 of this report includes extracts from the PG&E Standard Practices series 210.4 on record retention

[87] GasTransmissionSystemRecordsOII_DR_025-Q02(i) Supplement-Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

[88] See Standard Practice 463.7, Effective 12/1/1969, Page 3. This was submitted as PG&E Supplement 1, Attachment 1, in response to Data Request 25, Question 2(g).

[89] "Telephonic Interview of Larry Medina"; Investigation of: Pacific Gas & Electric Company September 9, 2010 Accident San Bruno, California; Docket No.: DCA-10-MP-008; National Transportation Safety Board; June 27, 2011.

We believe that the rules and regulations that should define retention were not systematically applied in the Gas Transmission Division. The implementation of the corporate records retention guidelines was haphazard at best. In the absence of clear retention schedules, employees either kept everything or disposed of records based on their own local office practices and business needs, rather than those of the organization. While a retention schedule was available, it did not encompass all record types present within the gas transmission business and was not well known around the division.

According to the National Transportation Safety Board report on San Bruno, "PG&E did not provide any design/material or construction specifications, inspection records, as-built drawings, or radiography reports."[90] The lack of controls detailed above and the impact statement below may help explain why.

Table 6-5: Impact Statement: Policies, Standards and Procedures (Records Retention)

IMPACT – POLICIES, STANDARDS AND PROCEDURES – RECORDS RETENTION
PG&E had retention standards from the 1950s to the present day, however it appears they were not well known around the organization and required that Divisions created their own retention schedules. This approach may well result in: • **An incomplete set of record types being identified;** • **Lack of a regular review and update to the schedules;** • **Out of date laws, regulations, standards and resolutions being applied against the records;** • **Untimely disposal of records; and / or, keeping personal data longer than regulations require;** • **Ignorance of the business needs to retain certain records;** • **Inconsistent methods for managing compliance with the retention standard practices;** • **Subjective, and / or, incorrect interpretation of laws and regulations resulting in:** ○ **Ignorance regarding 'legal holds';** ○ **Destruction of records that must be retained for the 'life of the facility';** ○ **Out of date versions of drawings, specifications and other records being retained as 'masters'; and this could lead to:** □ **Unsafe working practices** **Inaccurate pipeline data**

GARP® Assessment Criteria – Standards, Policies and Procedures – Records Retention							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1.5	1	1	1	1	1	2.5	2

[90] Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire San Bruno, California September 9, 2010 Pp. 25-26.

6.3.5. Business Continuity Planning and Vital Records

Vital records are those records essential to the functioning of an organization. They are records that protect the interests and rights of PG&E, its staff and major stakeholders. They include legal and contractual documentation, technical data and key operational records. Within PG&E some record types had been identified as vital and scanned or microfilmed. However, very few of the historical pipeline job files held had been treated in this manner, as evidenced by the size and scale of the post-San Bruno MAOP cataloguing and scanning project (see 8.5 Appendix 5).

The first standard practice identifying the need to secure and protect vital records was Standard Practice 210.4-5[91]. A letter dated 30 October 1969 refers to the standard practice and states that "This program is separate and distinct from the regular records retention and destruction program operated in compliance with FPC and CPUC regulations". The letter was sent out from the Corporate Secretary.

PG&E provided details of their Business Continuity Plan (BCP) process in data response 25.[92] Their response illustrated a good understanding of the mission critical business processes relating to gas supply. PG&E stated that each business unit that has mission-critical or essential processes has to update and submit an annual business continuity plan to PG&E's Risk and Audit Association by August 31st each year. Each of the relevant business units has to identify its "vital records" in its BCP. These are the records considered essential to daily operations, which would be immediately needed to resume business in the case of disaster or business interruption. PG&E reported that their BCP for the gas system operations was last tested on September 20–23, 2011. PG&E also reported that separate company-wide disaster recovery plans (DRP) exist that address electronic data and systems disaster recovery. These DRP's define the process for recovery and resumption of normal computer systems operations following a disaster. We were not informed of any comparable DRP for hardcopy records. PG&E's Gas Control Center has been based in downtown San Francisco for the last 30 years. Its current location is at 77 Beale Street with a secondary backup facility available in Brentwood.

The BCP's within PG&E's Gas Transmission Division pertain to the mission critical or essential business activities of the units within the Department. The BCP is different than, and unrelated to the Gas Transmission Division emergency plans, which define how to handle gas emergencies and how to restore services following an emergency. PG&E's Internal Report[93] highlights concern over the varying records management practices for the management of information relating to emergency zones and associated shutoff valves. For example, "some offices maintain this information in SharePoint while others are maintaining hard copies. In some offices

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[91] P2-197 (Chapter 2 and 2A Attachments) Memorandum Re: General Office, Vital Records Protection and Storage of, 10/30/1969

[92] Data Request 025-02 (a) (January 3, 2012)

[93] GasTransmissionSystemRecordsOII_DR_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization , Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

mapping houses physical emergency zone shutoff binders. In one office a large map was displayed that engineering was responsible for updating".

Table 6-6: Impact Statement: Policies, Standards and Procedures (Business Continuity & Vital Records[94])

IMPACT – POLICIES, STANDARDS AND PROCEDURES – BUSINESS CONTINUITY AND VITAL RECORDS[95]
PG&E recognized the need for a Vital Records Standard in 1969 as being "separate and distinct from the records retention program" and cited "key operational records" as being in the 'vital' category. It is important that this set of records is identified and included in all RM Program standards and guidance. Lack of understanding the difference between vital records and those required for retention, legal and business needs, may result in PG&E • **Identifying and protecting an incomplete set of records for business continuity purposes;** • **Confusing records that may be duplicated and retained in a secure and separate area with those that are required to be retained unchanged for legal and fiscal reasons; and,** • **Disposing of records that are dual purpose but where there is only one copy.**

GARP® Assessment Criteria – Business Continuity and Vital Records							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
-	1	-	-	1	2.5	-	-

6.4. Records Management Processes

PG&E did not have all of the necessary processes in place to ensure that traceable, verifiable, complete and accurate gas transmission pipeline information was available in a timely manner. Given the safety critical nature of PG&E's business, and the 100 year plus life expectancy of its pipeline infrastructure and its records[96] PG&E should have had in place records management processes that put greater emphasis upon managing its pipeline-records, completely and accurately, for the "life of the asset"; and focused on long term access, storage, retention, preservation and protection of its physical and digital records.

While PG&E is required to service its operations and maintain records that may be necessary for evidential purposes, it did not have the processes in place to maintain the integrity of its pipeline-related records, and even deleted its own pipeline history records. The lack of basic records management controls within the Gas Transmission Division led to a situation in which PG&E had:

- Multiple job numbers for the same job;
- Multiple versions of the same job folder, stored in one or more locations;
- Multiple storage locations for job folders relating to the same job;
- Multiple storage locations for the same document;

[94] The ARMA definition of a vital record can be found in section 8.6 Appendix 6 Glossary and definitions.

[95] According to the National Transportation Safety Board, "PG&E did not provide any design/material or construction specifications, inspection records, as-built drawings, or radiography reports." Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire San Bruno, California September 9, 2010, Pp. 25-26. This impact statement may help explain why.

[96] PG&E's earliest job folder dates back 106 years to 1906.

- Multiple storage locations for different versions of the same document;
- Duplicate documents, and duplicate versions of different documents;

PG&E end users often have to refer to many different systems, indexes, maps and offices in order to obtain all the relevant information they need about a given pipeline. Many staff spend at least half of their day searching for information (rather than actually performing their core functions), as the systems in use are not well integrated, contain duplicate information, and have significant data integrity (accuracy and completeness) issues.[97]

6.4.1. PG&E's Devolved Records Management processes led to unsafe pipeline practices

The way in which pipeline related documents, reports, files, folders, drawings and other key records have been created, named and numbered within PG&E has evolved over the last 100 years. One of the issues highlighted in the NTSB report was the lack of a complete and readily accessible archive of historical pipeline operations, identifying exactly what work had been undertaken on any given pipeline.[98]

In the present proceeding, PG&E has identified the term "master job file" or "master job folder", and used those terms "to differentiate a job file or folder that contains original documents, e.g., a red-lined as built drawing or an original STPR pinwheel, from other job files or folders that may contain duplicate copies of these and other documents."[99] PG&E considered the completed set job files stored in its Walnut Creek engineering library to be the "master job files", which it also calls "official files".[100] The findings of this study clearly demonstrate that the Walnut Creek engineering library did not maintain a complete, consistent and comprehensive set of pipeline related job folders at Walnut Creek. This is also true even when the combined holdings of Walnut Creek and the Bayshore Record Center are combined. In addition, PG&E was not aware of the location, distribution or local evolution of its job folders in its regional offices, some of which date back to the early 1920's. Figure 6-1 illustrates the number and vintage of jobs stored outside of the Walnut Creek office and Bayshore records center.

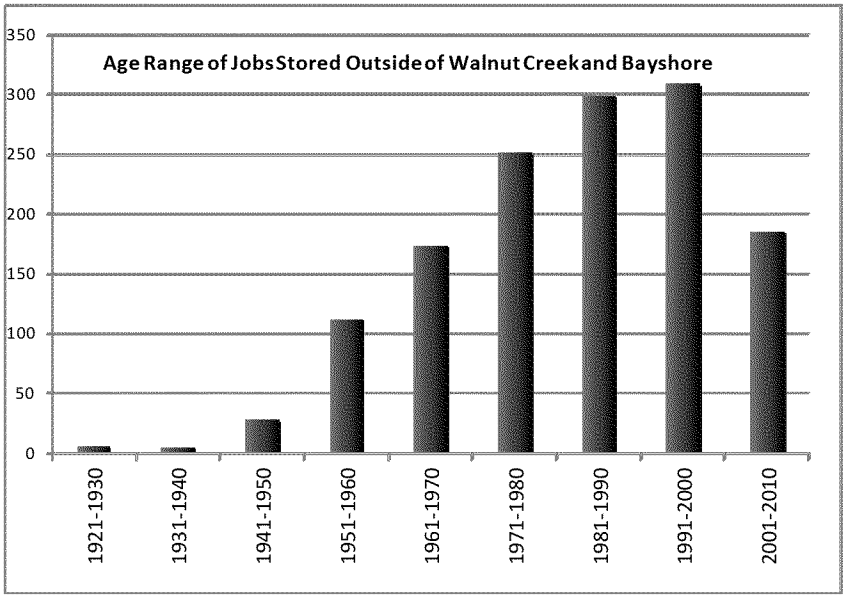
[97] GasTransmissionSystemRecordsOII_DR_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

[98] National Transportation Safety Board. 2011. Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire, San Bruno, California, September 9, 2010. Pipeline Accident Report NTSB/PAR-11/01. Washington, DC.

[99] See PG&E response to Data Request 17, Question 5 (Supp.) within PG&E response to Data Request 51, Question 4a.

[100] See PG&E response to Data Request 51, Question 5.

Figure 6-1: The Age Range of Jobs stored outside of Walnut Creek and Bayshore



As PG&E had not created a definitive master document store of all pipeline-related job files, or even a definitive index to them, and had disposed of its historical pipeline history files, there was no single place to go to find all of the relevant documentation for a pipeline, or pipeline segment. The following section reviews the control processes in place relating to the naming, numbering and the cataloguing systems used to index, track and control PG&E's pipeline records.

6.4.2. Pipeline Records and the Importance of Job Files

While pipelines are the result of complex engineering activities, the lifecycle of a pipeline can be explained in far more simple terms. Pipelines are designed, built, installed, maintained and at the end of their safe working life, either abandoned, removed or replaced. Sometimes during their lifecycle, significant modifications are necessary to accommodate unforeseen events or changes in local conditions, such as the 1956 modifications to Line 132 in San Bruno.

The original designs, drawings, construction details, test certificates and any other supporting documentation created during the initial design-build-install activities form an important set of pipeline-related records that are as important during the lifetime of the pipeline, as they were during its initial design and construction. These records may be updated and added to over time, as the pipeline is both maintained and/or modified, and will be used to facilitate its safe removal, replacement or abandonment at some point in the future.

In order to provide traceable, verifiable and complete information on each pipeline, these records need to be managed in a consistent and controlled manner and retained for the life of the asset, in a readily accessible form. Within PG&E's Gas Transmission Division the primary construction project, maintenance and other activities performed on any pipeline are grouped into discrete work packages, referred to as "Jobs". Each work package or "Job" is allocated a unique "job number", and each "job" stores its records in one or more "job folders". Historically, these "job

folders" were paper or cardboard wallets designed to hold the physical evidence of the "job". While these "job folders" hold information critical to the development of any integrated pipeline information management system, they were not organized or stored by pipeline or in any other way that would have facilitated ready access to pipeline-related information. This is evidenced by the scale of work required to review the files during the MAOP Records Validation Project (See 8.5 Appendix 5). For many years, the "Job Number" was simply a sequential number allocated to provide a unique reference to the work package. There were no embedded codes within the job number and no ways to work out which pipeline or pipeline segment it related to without consulting the file itself, or a separate series of index maps, plat sheets, and pipeline summary sheets.

Prior to 2010 there was little formal structure to the internal contents of the historical job folders. While there were common document types present, information was placed in the job folders in a rather haphazard fashion. There was no clear separation of individual sections, nor was there a definitive pipeline features list (PFL) which could be used as a checklist for the presence or absence of key document types within the job folder. Since that time, as part of the MAOP project, PG&E has identified 44 different document types and has created a 420 page document type manual, and a book of examples of the various vintages of documentation present.

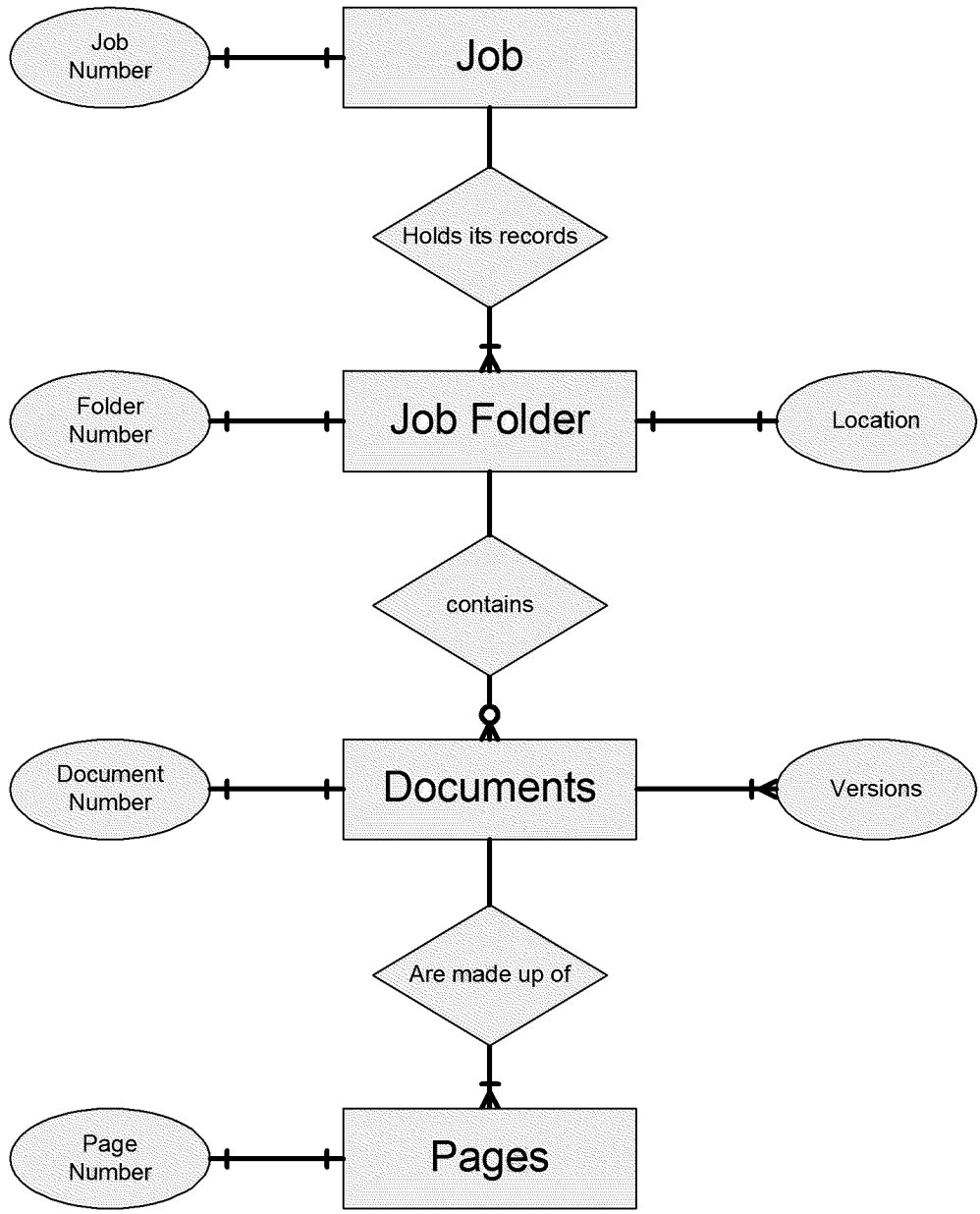
It must be stressed that the relationships among "jobs", "job numbers" and "job folders" is critical to the discussions that follow in this report. These relationships are illustrated in figure 6-2 overleaf. In addition, the role of the PG&E "job number" needs to be highlighted.

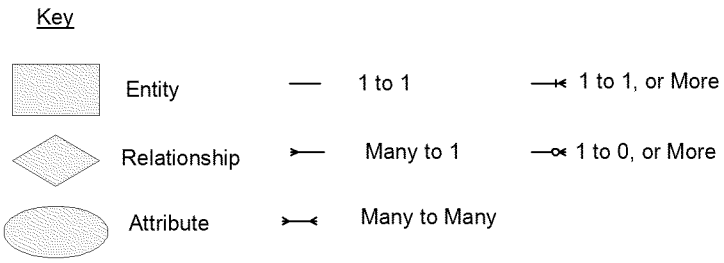
It is easy for the layperson to confuse the terms jobs, job folders and job files. Within PG&E the term "job files" is used to describe both a collection of job folders relating to a single job file; a set of job folders relating to multiple jobs; or a single job folder related to a single job number. Normally, a job is allocated a unique job number, which then permanently identifies every document, record and piece of information relating to that job.

The PG&E "job number" is a one to fourteen digit alphanumeric reference that forms the unique primary key and link between the pipeline and the documentation detailing the work undertaken on it. However, PG&E stated that it "treats any variation in a job number as a unique job number and catalogs it as a separate job file (e.g. 445230 and 0445230 count as (two) unique job numbers). As a result the count of job file numbers reported here exceeds the total number of job files associated with particular projects."[101] For PG&E, this causes inadequate front-end data validation, creates data quality problems that cascade throughout PG&E information systems and could have unexpected consequences. This is a fundamental impairment to PG&E's gas pipeline integrity management efforts.

[101] PG&E Data Response Supplement to Data Request 25, Question 1, submitted January 31, 2012, Page 2.

Figure 6-2: An illustration of the expected relationship with Pipeline-related Jobs, Job Folders and related documentation





6.4.3. Pipeline Records and 'Duplicate' Job Files

As PG&E holds pipeline assets dating back over 106 years, it cannot rely upon the tacit knowledge of its staff to remember exactly who, what, where, when, why and how work was undertaken on its pipelines. It has to rely upon its records and ensure that any information derived from them is traceable, verifiable and complete. As such, the control, management and availability of the PG&E job folders should have been seen as an essential and safety critical task. For example, any corruptions of the "job number" due to transposition errors, or mislabeling, misnaming or misfiling of the "job folders" would render the pipeline information contained within them inaccessible and place the safety of the relevant pipeline at risk. The relationships of PG&E's pipeline-related jobs, job folders and related documentation in reality are far more complex and problematic than shown in Figure 6-2 and first described. This is due to the uncontrolled duplication and local evolution of PG&E's job "folders" over many years prior to the San Bruno pipeline rupture and fire. A more realistic model of the current situation and relationships is presented in figure 6-3 overleaf.

The lack of records management control over the production, duplication, maintenance and control of job folders meant that there was no complete and definitive master set of pipeline-related records that could be readily identified and located relating to any given capital project. There was no single set of folders that held a complete and comprehensive set of information for that job. This is true despite PG&E assertions[102] that a master set of pipeline related job files was held at Walnut Creek prior to the MAOP Validation and Verification Project, as discussed in detail in section 8.5, Appendix 5.

PGE's assertions regarding master files appear to be at odds with its own internal findings. PG&E's own data response[103] highlights the fact that in 2012: "Each office's practices for management and storage of job folders vary". "Many of the different areas that touch a particular job maintain their own folder of information as the job is passed along from function to function"; and as such "Duplicate job folders and thus duplicate information can potentially exist between Gas Transmission Records, Division Offices, Engineering, Construction, and Billing"; and that "the "location of certain records is often based on institutional knowledge of the local staff that varies from location to location"; This issue is compounded by the fact that each of the different copes of the job folder evolves in situ as local staff deposit additional documents into them without updating other copies held elsewhere. As such, the actual contents for the same "job folder" may vary quite considerably from office to office. Given the importance and safety critical nature of the pipeline-related information held in its job files, we believe that PG&E failed in its duty of care to ensure that this information was correctly managed and controlled throughout its life-cycle, as part of its ongoing operations.

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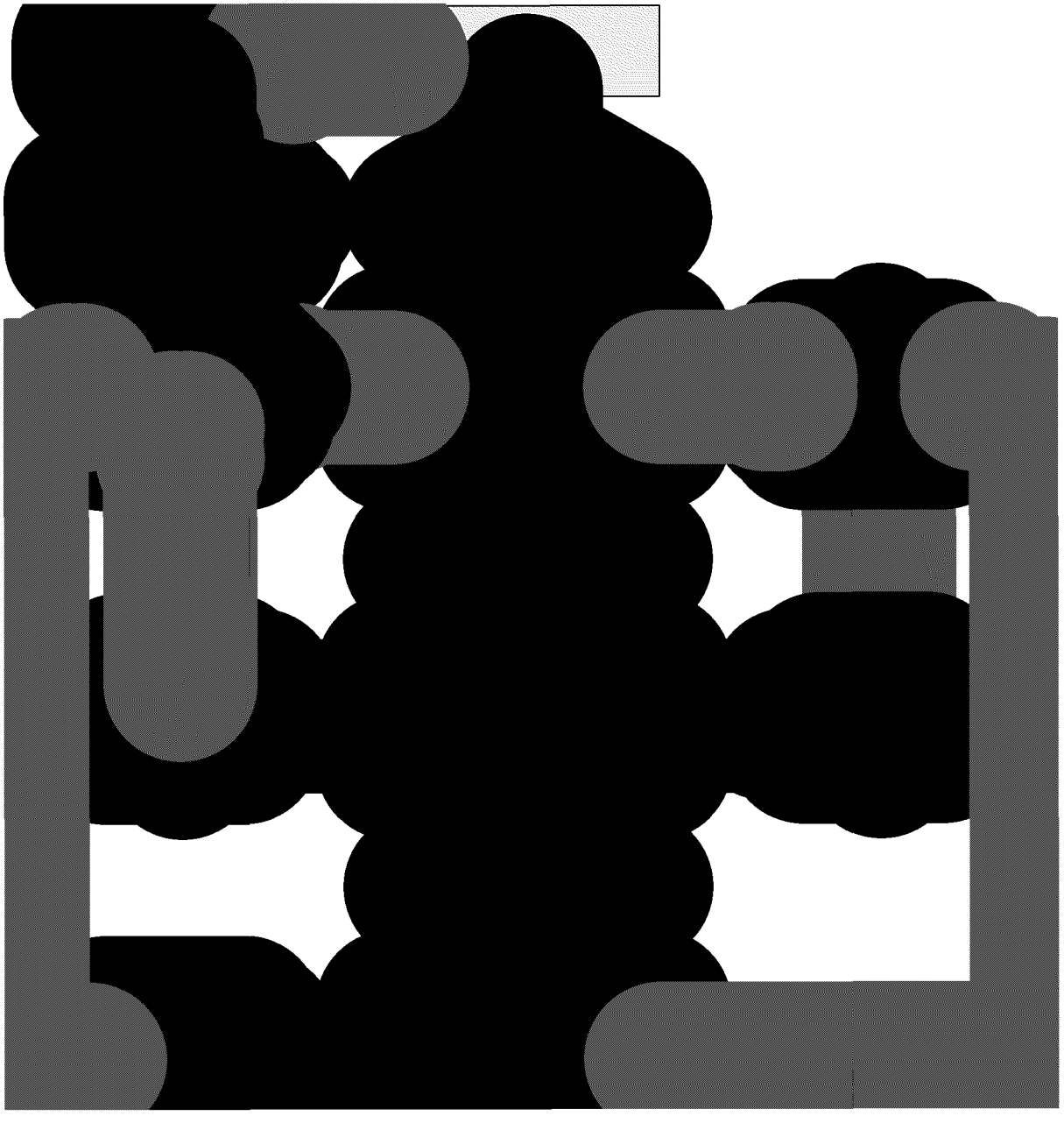
[102] See PG&E response to Data Request 17, Question 5 (Supp.); See also PG&E response to Data Request 51, Question 4a; See also PG&E response to Data Request 51, Question 5.

[103] GasTransmissionSystemRecordsOII_DR_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

Figure 6-3: An illustration of the actual relationship with Pipeline-related Jobs, Job Folders and related documentation



6.4.4. PG&E Destroyed its Entire Collection of Pipeline History Files

We understand from the deposition of Larry Medina[104] and PG&E's own policy records[105] that in addition to the "job folders" described in the previous section, PG&E's Gas Transmission Division also maintained a complete set of pipeline history records, up to at least 1993. These records contained information about each and all pipelines in the transmission system and formed a primary focal point for pipeline related enquiries. They referenced all of the construction and maintenance jobs that were carried out on each pipeline, and were based upon information obtained from the respective job files and drawings, maps and other job-related information.[106]

While the pipeline history records were really a secondary source of information, derived from a variety of primary sources such as the job folders, they were an invaluable source of information for engineering staff as they provided a readily accessible and comprehensive, pipeline-centric view of all the activities undertaken on, and the information available for, any given pipeline, or pipeline segment.[107] The pipeline by pipeline analysis afforded by pipeline history records provided a handy and accurate means to review safety critical pipelines attributes and to prioritize risk with respect to other pipelines. It is worth noting that the size and scale of the MAOP records validation project, see 8.5 Appendix 5, highlighted how unsuitable the PG&E job files were for pipeline safety work and how inaccessible they were for routine access to pipeline information on a daily basis.

As of December, 1969, PG&E had an extensive standard practice that explicitly set forth requirements for establishing and maintaining these pipeline history files. In particular, the standard practice required, "History records for numbered transmission lines shall be filed by line number, with all pertinent inclusions of data shown. . . indexed for ready reference, and cross-referenced to other permanent files, such as GM or Work Order files." It also required that "The complete pipeline and main history files shall be maintained up to date by the Division or department for the life of the operating facility."[108] While the importance of the Pipeline History Files was recognized by records management staff at the time, a decision was made in 1986,[109] to no longer maintain these history records and only record key information on the pipeline summary sheets, which was contrary to the 1969 policy listed in PG&E's Pipeline Maintenance

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[104] "Telephonic Interview of Larry Medina"; Investigation of: Pacific Gas & Electric Company September 9, 2010 Accident San Bruno, California; Docket No.: DCA-10-MP-008; National Transportation Safety Board; June 27, 2011.

[105] See Standard Practice 463.7, Effective 12/1/1969, Page 3. This was submitted as PG&E Supplement 1, Attachment 1, in response to Data Request 25, Question 2(g).

[106] Ibid.

[107] Natural gas pipelines are separated into segments typically 40 to 80 feet long.

[108] See Standard Practice 463.7, Effective 12/1/1969, Page 3. This was submitted as PG&E Supplement 1, Attachment 1, in response to Data Request 25, Question 2(g).

[109] "Telephonic Interview of Larry Medina"; Investigation of: Pacific Gas & Electric Company September 9, 2010 Accident San Bruno, California; Docket No.: DCA-10-MP-008; National Transportation Safety Board; June 27, 2011.

Handbook.[110] Before he left PG&E in 1992, Medina alerted the company to the fact that since the split of Gas Operations in 1986-87 many standard functions had not been performed or kept current, including the maintenance of the pipeline history files, pipeline plat sheets and pressure reports for the DBU transmission lines. This was due in part to the "extensive backlog and a perceived lack of importance of the data reflected on the drawings". However, as the company was also focused upon workload/headcount/dollars, it had elected not to do some of the work and used the headcount elsewhere.[111] As such, Medina's recommendations to resurrect the pipeline history files from 1986-92 and maintain them point forward was never approved. In December 1992 Medina warned the company of its failure to maintain the pipeline history files/records; the incomplete and/or inaccurate nature of its facility drawing records and the need to address basic issues around policy, responsibility and authority. Within, six months of his memo, however, Medina's own role in managing the records and information systems for the gas transmission division was made redundant[112].

PG&E confirmed that it has numerous security measures in place to protect records from unauthorized access/destruction, [113] however, following office moves in the mid 1990's its entire collection of historical pipeline files were lost. While PG&E believes that they were inadvertently destroyed, it has not been able to provide a satisfactory explanation or justification to explain how and why this occurred, or to demonstrate that the record destruction was either authorized, or followed the PG&E retention policy in place at the time of their disposal.

Discarding these pipeline history records reduced PG&E's ability to readily access safety critical pipeline information. Given the importance and safety critical nature of its pipeline history files, we believe that PG&E failed in its duty of care to ensure that this information was correctly managed and controlled throughout its lifecycle, as part of its ongoing operations.

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[110] See Standard Practice 463.7, Effective 12/1/1969, Page 3. This was submitted as PG&E Supplement 1, Attachment 1, in response to Data Request 25, Question 2(g).

[111] Potential Effects on Basic Workload from the Addition of the Former DBU transmission Facilities. Appendix A, Part 1 to "Telephonic Interview of Larry Medina"; Investigation of: Pacific Gas & Electric Company September 9, 2010 Accident San Bruno, California; Docket No.: DCA-10-MP-008; National Transportation Safety Board; June 27, 2011. I.11-02-016 AYK/lil.

[112] Maintaining Accurate Gas Transmission and Storage Facility Drawings. Appendix A, part 2 to "Telephonic Interview of Larry Medina"; Investigation of: Pacific Gas & Electric Company September 9, 2010 Accident San Bruno, California; Docket No.: DCA-10-MP-008; National Transportation Safety Board; June 27, 2011. I.11-02-016 AYK/lil.

[113] Data Request 025 -02 (January 3, 2012)

Table 6-7: Impact Statement: RM Processes (Disposal of Historical Pipeline Files)

IMPACT – DISPOSAL OF HISTORICAL PIPELINE FILES
The lack of control, protection, and premature destruction of Pipeline-related documentation (files, folders, drawings, maps etc.) leaves PG&E exposed to: • **Inability to locate safety critical pipeline information;** • **Poor decision making based upon incomplete information leading to costly and potentially fatal mistakes;** • **Poor management of safety critical assets;** • **Failure of its integrity management program;** • **Inaccurate databases, poor data quality and missing pipeline attributes;** • **Failure to comply with legal and business requirements;** • **Inefficient and ineffective information retrieval and time consuming searches;** • **Failure in its duty of care to maintain and retain records throughout their life-cycle; and,** • **Legal and fiscal penalties.**

GARP® Assessment Criteria – RM Processes – Disposal of Historical Pipeline Files							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1	1	1	1	1	1	1.5	1

6.4.5. Even Minor Errors in Data Quality can have a Profound Impact upon Safety

Given the importance placed upon historical job folders and the evidence that they contain, we were surprised that PG&E did not have ready access to the start dates for any of its jobs, and by inference job folders/files, prior to 1996. While the start dates for all capital jobs and by inference their related job folders, can be obtained directly from PG&E's SAP (Enterprise Resource Planning) database from 1996 to date, start dates for jobs prior to 1996 are not available electronically. PG&E reported that such information could be manually extracted from the PG&E microfiche collection of job folders from 1983 to 1996. However, the start dates for jobs prior to 1983 would require a manual review of the relevant job files[114].

The importance of accurate start dates has an extremely important bearing on the San Bruno investigation and the identification of safety critical records related to PG&E's Gas Pipeline Replacement Program (GPRP) as illustrated in the following example.

As part of Data Request 44, PG&E submitted a report,[115] from 2007 prepared by PG&E's Chief Technical Consultant in Gas Transmission and former employee (consultant)[116]. In his report, the consultant discussed the technical assessment criteria used to identify pipelines for replacement, as documented in his 1985 presentation on the Gas Pipeline and Replacement Program (GPRP) to the PG&E Management Committee.

[114] Data Request 025 (December 19, 2011). GasTransmissionSystemRecordsOII_DR_CPUC_025Q01 Page 10

[115] GasTransmissionSystemRecordsOII_DR_CPUC_044-Q01(a)_Atch32

[116] Identity of the consultant withheld due to PG&E confidentiallyrequirements.

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In his report, PG&E's consultant states that:

> "the original GPRP targeted as a minimum, pipelines constructed using oxy-acetylene and bare electrode girth welds, as well as pipelines constructed using Bell-Bell-Chill-Ring (BBCR) and Bell-Spigot (BLSP) joints". In 1995 PG&E issued a "Review of the Transmission Priority Analysis (1994 Revision) for the Gas Pipeline and Rehabilitation Program. This document was prepared by Bechtel. Paragraph 3.2 of this document states that: the transmission priority analysis is applicable to all gas transmission lines and distribution feeder mains operating in excess of 60 psig. The database includes transmission pipelines installed through 1992. However, the scope of the GPRP includes only pipe installed in 1947 and prior years".

In order to complete his 2007 report, [117] PG&E's consultant examined PG&E's GIS data and two job folders, and found:

- Job 98015 – Transmission Line 132: Date of Operation December 6, 1948, Date work completed December 5, 1951 (contained BBCR joints)
- Job 95174 – Transmission Line 151: Date in operation December 12, 1947, Date Work Completed June 17, 1948 (contained BLSP joints).
- The Gas Transmission GIS showed that no BBCR joints were used in pipelines after 1948 and no BLSP joints in pipelines after 1947.

It is important to note that the report of PG&E's consultant[118] recognizes that in 1995, PG&E had selected the wrong year as the upper limit for its Gas Pipeline Replacement Program, i.e. 1947 rather than 1948, and states that "it would be prudent to use pre-1949 as a basis for assessing the excavation threat (as identified in ASME B31.8S) to PG&E's gas transmission pipelines". The consultant's report also highlights the importance of accurate metadata and the uses to which it may be put. While there is only a one year difference between the two dates (1947 and 1948), PG&E's selection of the wrong threshold value has a major impact upon pipeline safety as it led to the exclusion of both line 132 and line 151 from the 1995 Gas Pipeline Replacement Program. The consultant's report,[119] is also important in that it provides direct evidence that as early as 2007 PG&E was informed that Line 132 pipeline contained potentially unsafe welds and should have been included in the 1995 Gas Pipeline Replacement Program.

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[117] Ibid.

[118] Ibid.

[119] Ibid.

During his review, the consultant[120] also noted data quality issues with the PG&E GIS data and highlighted the fact that the pipeline "Install date" in the GIS often corresponded with the date shown in the job folder as "Work Completed" which in several cases was years after the pipeline was pressurized and placed in operation. As such, he recommended that PG&E's GIS should state the actual year that the pipeline was installed as the "Date of Operation".

Table 6-8: Impact Statement: Lack of Complete Pipeline Records and Job folders

IMPACT – PIPELINE RECORDS (and job folders)[121]
The lack of a complete, consistent and readily accessible set of pipeline records covering the lifetime of each pipeline leaves PG&E exposed to: • **Inability to locate safety critical pipeline information;** • **Poor decision making based upon incomplete information leading to costly and potentially fatal mistakes;** • **Poor management of safety critical assets;** • **Inaccurate databases, poor data quality and missing pipeline attributes;** • **Failure of its pipeline integrity management program;** • **Failure to comply with legal and business requirements;** • **Inefficient and ineffective information retrieval and time consuming searches;** • **Failure in its duty of care to maintain and retain records throughout their life-cycle; and,** • **Legal and fiscal penalties**

GARP® Assessment Criteria – RM Processes – Pipeline Records							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1	1	1	1	1	1	1.5	1.5

6.4.6. Background on PG&E's Cataloguing, Tracking and Retrieval

The terms "document cataloguing system" or "document catalog" are used within the context of this report to refer to any centralized repository or document providing an inventory (list) of PG&E records (or record categories) and information facilitating the location of electronic or physical documents or data but not containing the documents themselves. A history of the development of document catalogs/cataloguing systems was provided by PG&E,[122] and is discussed in the following sections. PG&E was limited in the level of detail it was able to provide regarding historical cataloguing practices due to staff retirement (and the loss of domain knowledge) and the fact that the document cataloguing systems used in local division and district offices varied depending in part on the PG&E facility and its particular needs.[123] We were able to establish that in 1948 PG&E adopted a standardized Decimal File System based upon the

[120] Ibid.

[121] According to the National Transportation Safety Board, "PG&E did not provide any design/material or construction specifications, inspection records, as-built drawings, or radiography reports." Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire San Bruno, California September 9, 2010, Pp. 25-26. This impact statement may help explain why.

[122] Data Request 025 -03 (January 23, 2012)

[123] Data Request 025 -03 (January 23, 2012)

Dewey Decimal System and published a manual outlining this system. PG&E revised its Decimal File System manual periodically, with eight editions published from 1948 to 1990.[124] PG&E's decimal file system was not applied to job files, but was used to standardize the filing and document retrieval system for intra-company memoranda and correspondence.

PG&E did not begin to computerize its catalogs until the early 1990's[125] when PG&E began converting from paper-based to electronic catalogs. PG&E currently uses the following "electronic catalogs": DocuTrak,[126] (Walnut Creek Engineering Library System); FoxPro (Bayshore) and FileMaker pro,[127] (Emeryville). Two of these catalogs, DocuTrak and FoxPro were in active use prior to September 9 2010. In addition, PG&E has two systems that manage and track the status of gas transmission jobs SAP,[128] and Project Status and Reporting System (PSRS).[129] Both of these systems were in place prior to September 2010. However, neither SAP nor PSRS is used to catalog or track individual job-folders or documents. While both of these systems can provide lists of post-1996 transmission job numbers, the only systems that were used for record tracking were DocuTrak, FoxPro and Filemaker Pro. These three systems are discussed in order below.

DocuTrak: DocuTrak is used within PG&E's Walnut Creek Engineering Library to track station drawings, foreign prints (e.g. station drawings created by an external vendor) and station manuals. It did not maintain a comprehensive inventory of all job folders (or their duplicates). Retrievals using this system are undertaken via a records request form, submitted to the records department. Check-out/Check-in functionality is available, and an employee may check out an item for up to a month. PG&E's IT department backed-up DocuTrak on a daily basis. However, after eight days the back-up tape is overwritten with the latest iteration. Given this process, PG&E could not provide a snapshot of the system as it existed at the time of the San Bruno incident, or prior to the start of the MAOP Validation and Verification Project. During our site visits, this system was reported by PG&E staff as being somewhat inflexible in terms of its search capabilities, with data needing to be exported and loaded to Excel in order to undertake a simple 'date' search. In addition, PG&E's Internal Report[130] reported that its record-keeping systems were "not well integrated, contain duplicate information, and have significant data integrity (accuracy and completeness) issues". It also stated that the "location and organization of physical records varies by location and is often only known to a few individuals performing the filing".

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[124] The 1983 1990 editions of the Decimal File Manual are provided in (a) GasTransmissionSystemRecordsOII_DR_025Q03atch01 and (b) GasTransmissionSystemRecordsOII_DR_025-Q03atch02.

[125] Chapter 2 of PG&E's June 20, 2011 response, subsequently updated on September 30, 2011, and January 13, 2012.

[126] GasTransmissionSystemRecordsOII_DR_025)Q04Atach2.xls

[127] GasTransmissionSystemRecordsOII_DR_025)Q04Atach1.xls

[128] GasTransmissionSystemRecordsOII_DR_021-08.

[129] GasTransmissionSystemRecordsOII_DR_025)Q04Atach4.xls

[130] GasTransmissionSystemRecordsOII_DR_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

FoxPro™: FoxPro™ was used by PG&E to track records (predominantly boxes) stored at its Bayshore Records Center facility.[131] Prior to the MAOP Records Validation Project, PG&E Records Center staff used FoxPro to record information about requests (including the date, box or item requested, box location, and the name and contact information of the requester). As FoxPro™ maintains its check-out history indefinitely it was possible to obtain a view of the system as of October 19, 2010.[132] FoxPro™ did not, however, contain a comprehensive index for all of the job folders in the Gas Transmission boxes in its custody. This was evidenced by the Cow Palace sorting exercise (see 8.5 Appendix 5) which required 30 man-years of manual effort to locate pipeline related job folders in the 100,000+ boxes 'buried' in PG&E's Bayshore Records Center. If a comprehensive catalog of all job folders within PG&E had been in place, the Cow Palace sorting exercise would not have been necessary, and folders could have been retrieved, as required on a pipeline-by-pipeline basis.

Filemaker™: In 2011, PG&E developed its own Filemaker™-based cataloguing system to track the location of physical boxes and folders it had collected at the Emeryville storage facility. Because the Emeryville facility was set-up and designed to hold boxes and folders pertinent to the MAOP Records Validation Project, and not to check them out, Filemaker™ is used to track the location of boxes and folders housed within the facility itself. It was not designed or used for purposes of tracking "checked out" folders or documents to other locations within the Gas Transmission Division.

6.4.7. The total number of job folders that exist within PG&E is still unknown

While PG&E has been able to quantify the number of jobs and job folders "identified as potentially relevant to the MAOP Project" it was not able to confirm that it had a complete and comprehensive inventory of all job-folders, across all of its offices. When requested to provide an estimate of the number of jobs and job folders that exist, PG&E used its ECTS system[133] to calculate the number of jobs, and its Emeryville Filemaker™ database to provide an estimate of the number of corresponding job folders (rather than its Emeryville database, where actual Job and Job Folder information was available). PG&E was extremely reticent in providing any information on the number and relationship of job-files and job-folders from the Emeryville database, or releasing any information that would permit an analysis of such relationships. As such, it took two data requests, numerous meetings and phone calls and months of elapsed time before CPSD was provided with an extract from the Emeryville database upon which we could base our analysis.

[131] Upon completion of the Cow Palace sorting exercise, pipeline-related records were transferred to Emeryville. All other records were transferred to commercial storage with Iron Mountain, i.e. they were not returned to Bayshore.

[132] GasTransmissionSystemRecordsOII_DR_CPUC_025 -Q03atch14

[133] See chapter 6.5 for further details.

Table 6-9: PG&E Job Statistics (as of December 9, 2011)

Source: ECTS	
	ECTS (Measured in Unique Job Numbers)
Number of Jobs	24,290
Number of Jobs Scanned (in full)	3,410
Number of Jobs Planned to be Scanned	Unknown
Number of Jobs Partially Scanned	17,040

Table 6-10: PG&E Job Folder Statistics (as of December 9, 2011)

Source: Emeryville Filemaker™ Database	
	Emeryville (Measured in job folders)
Number of job folders	136,240
Number of job folders Scanned (in full)	32,000
Number of job folders Planned to be cataloged and Scanned	875 boxes (containing an unknown number of folders) stored at Emeryville
Number of job folders partially scanned	25,500

In addition to the 136,240 job folders reported in Emeryville, a further 9426 job folders relating to an unspecified number of Jobs were recorded as scanned in-situ in the regional offices and left in place, rather than being transferred to Emeryville.

While it was difficult to make any direct comparison between the two discrete sets of file and folder statistics provided by PG&E, the information provided illustrate the size and scale of the task facing the Gas Transmission division. Over a year after San Bruno, less than half of PG&E's pipeline–related job folders had been scanned (23.5% of job folders scanned in full, 18.7% partially scanned). In terms of the job files reference in ECTS, 14% of the 24,290 jobs listed had been scanned in full while 70% had only been partially scanned. A comprehensive analysis of the relationship and distribution of PG&E's jobs and job folders is presented in section 6.4.10 based upon the information provided in Data Request 48.

Table 6-11: Impact Statement: RM Processes (Cataloguing, Tracking and Retrieval)

IMPACT – RM PROCESSES – CATALOGING, TRACKING and RETRIEVAL[134]
The lack of single complete, consistent and readily accessible catalog of pipeline records covering the lifetime of each pipeline leaves PG&E exposed to: • **Inability to locate safety critical pipeline information;** • **Poor decision making based upon incomplete information leading to costly and potentially fatal mistakes;** • **Poor management of safety critical assets;** • **Failure of its integrity management program;** • **Inaccurate databases, poor data quality and missing pipeline attributes;** • **Failure to comply with legal and business requirements;** • **Inefficient and ineffective information retrieval and time consuming searches;** • **Failure in its duty of care to maintain and retain records throughout their life-cycle; AND,** • **Legal and fiscal penalties.**

GARP® Assessment Criteria – RM Processes – Cataloging, Tracking and Retrieval							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1	1	1	1	1	1	1.5	1.5

6.4.8. PG&E did not have a process in place to control the distribution, duplication and storage of its job folders

PG&E did not maintain a complete and comprehensive index of the number or types of documents associated with each job prior to September 2010 or the number/location of the job folders associated with each job. PG&E has two systems that manage and track the status of gas transmission jobs SAP and PSRS. Both were in place prior to September 2010, but only hold details of post-1996 transmission jobs. While SAP and PSRS track job status, neither system was used to catalog or track individual job folders or documents. Both SAP and PSRS contain the same job lists (the approved job information in PSRS is based on information downloaded from SAP). However, they serve very different purposes.[135] PG&E adopted SAP as its accounting system in 1996. Job information from before that time is stored in various systems and has not been migrated to SAP (or, by extension, to PSRS). Prior to August 2010, PG&E did not have a

[134] The National Transportation Safety Board stated that, "Radiographs of the girth welds also captured a small portion of the longitudinal welds from each of the two pipe segments joined by the girth weld being radio graphed. Records from the 1948 project included logs for 209 radiographs, including 19 rejected welds, 4 of which were re-examined and determined to be acceptable. Those four were all longitudinal welds. Of the remaining 15 rejected welds, 5 were longitudinal welds and 10 were girth welds. An additional 14 girth welds were classified as "borderline." Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire San Bruno, California September 9, 2010, Page 25. Given this lack of single, complete, consistent comprehensive and readily accessible list of pipeline files, it raises the question of whether a comprehensive list of records from the 1948 project were available.

[135] PSRS can be distinguished from SAP because it has additional data and search fields that SAP does not include. For example, the "memo" fields in PSRS allow PG&E employees to input notes about various aspects of a given project. Additionally, PSRS includes both proposed and approved jobs while SAP includes only approved jobs.

master index encompassing all job files. PG&E states that it did possess the capability to generate a relatively comprehensive list of job files numbers through either SAP[136] or GIS.[137] Neither of these systems was used to catalog or track individual job folders or documents, only FoxPro, Filemaker and DocuTrak - have document tracking facilities. In addition, PG&E's GIS system holds job-related information dating back as far as 1906, but is not as comprehensive as the post-1996 data captured in SAP.

One of the reasons cited by PG&E for the lack of folder/document tracking prior to the San Bruno pipe rupture and fire was that "PG&E's gas transmission organization is geographically far-reaching enterprise that generates significant numbers of documents".[138] This is a somewhat naïve response and attempts to mask the far more systemic failure of records management within the Gas Transmission Division.

PG&E has hired a third party, Pricewaterhouse Coopers (PwC) to prepare a report about its record management practices (hereafter called PG&E's Internal Report)[139] which provides a more realistic picture. It states that job folders: "often contain duplicated and unnecessary information"; transferring physical files results "in lost time/inefficiency and potentially lost paperwork"; there is a "lack of standardization of job folder contents and the order of the documents"; "each office's practices for management and storage of job folders vary"; "Many of the different areas that touch a particular job maintain their own (copy of the job) folder of information as the job is passed along from function to function"; and therefore "duplicate information can potentially exist between Gas Transmission Records, Division Offices, Engineering, Construction, and Billing". In addition, PG&E's report goes on to state that: "many mappers spend at least half of their day searching for information"; "staff have to make trips to the old office to retrieve records, or waste time sending documents back and forth via the mail"; and that the record keeping systems "are not well integrated, contain duplicate information, and have significant data integrity (accuracy and completeness) issues".

For more than 50 years, Juran's Quality Handbook[140] has been an essential reference to quality management and engineering. In his book, Juran describes data to be of high quality "if they are fit for their intended uses in operations, decision making and planning". We believe that this principle can also be applied more broadly to the quality of the engineering records, and their metadata. If so, the deficiencies highlighted in PG&E's own records keeping practices by the NTSB report, this study and that of PG&E's Internal Report illustrate that the PG&E records

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[136] SAP holds details of all Gas Transmission and Distribution jobs since 1996

[137] Data Request CPUC_025 -03 (January 23, 2012)

[138] Data Request CPUC_025 -03 (January 23, 2012)

[139] GasTransmissionSystemRecordsOII_DR_CPUC_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

[140] Juran, J.M. and Defeo, J.A. (2010) Juran's Quality Handbook: The Complete Guide to Performance Excellence, Sixth Edition.

were of low quality, in that they were not kept in a manner fit for their intended uses in operations, decision making or planning. This factor posed a major risk to the safety of PG&E operations.

Table 6-12: Impact Statement: Records Management (RM) Processes (Job File Tracking Systems)

IMPACT – RECORDS MANAGEMENT PROCESSES – JOB FILE TRACKING SYSTEMS
The lack of single complete, consistent, comprehensive and readily accessible list of Pipeline-related Job Files and associated metadata covering the lifetime of each pipeline leaves PG&E exposed to: • **Inability to locate safety critical pipeline information;** • **Poor decision making based upon incomplete information leading to costly and potentially fatal mistakes;** • **Poor management of safety critical assets;** • **Failure of its integrity management program;** • **Inaccurate databases, poor data quality and missing pipeline attributes;** • **Failure to comply with legal and business requirements;** • **Inefficient and ineffective information retrieval and time consuming searches;** • **Failure in its duty of care to maintain and retain records throughout their life-cycle; and,** • **Legal and fiscal penalties.**

GARP® Assessment Criteria – RM Processes – Job Tracking Systems							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1	1	1	1	1	1	1.5	1.5

6.4.9. PG&E's Job Numbering Process has Significant Gaps & Data Quality Issues

A list of "unique" job numbers (36,055) was provided by PG&E,[141] derived from the "Job Number" data field in ECTS. The jobs listed included those created for capital projects and tracked in GIS and on transmissions and distribution plats; and included files that had not originally belonged to a capital job category, but that PG&E recognized as being important to the MAOP Records Validation Project. The latter category of jobs accounts for less than 10% of the total jobs listed.

Given the importance of the job number we were surprised by the lack of consistency applied to the allocation of PG&E job numbers. While we accept that the job-numbering system evolved over an extended time period, the diversity of different job naming and numbering styles and data quality issues, revealed by an examination of this list is a cause for concern. The large range of different naming conventions used to identify the PG&E jobs and job folders within ECTS, coupled with PG&E's inconsistent application give rise to a number of data quality issues associated with the job numbers themselves. This lack of standardization and consistency is a

[141] GasTransmissionSystemRecords OII_DR_CPUC_025-Q01 attachment01.

major barrier to information retrieval and may go some way to explain the difficulties faced by PG&E and NTSB staff when attempting to access relevant job-related information.

Examples of different job number types and quality issues are presented overleaf. Due to the lack of a central catalog or tracking system for all job files, PG&E reported that it was unable to provide an estimate of the number of 'missing' pipeline job files, and was only prepared to state that it was "reviewing all relevant sources of job numbers as part of the MAOP validation effort".[142] This review has identified that there are significant numbers of gaps in sequence in the job list that PG&E provided. A simple stepwise comparison of job file numbers 0-10,000[143] revealed that only 3252 (32.5%) were listed in ECTS, while 6748 out of 10,000 (67.5%) project numbers were missing from this series. The lack of a comprehensive catalog of PG&E job files means that there is no way to tell if these numbers were ever allocated to a project, or if job folders were created for them that have since been destroyed. In our opinion, however, the random nature of the sequence gaps and the completeness of some sequences (e.g. 4001-5000 – no omissions) are indicative of large numbers of "missing" job files.

[142] Data Request CPUC_025 -01 (December 19, 2011)

[143] For the purpose of this comparison job numbers and their alphanumeric equivalents were matched (e.g. job 4117C was treated as Job 4117).

Table 6-13: PG&E's Job Numbering Systems and their Data Quality Errors

Types of Job Numbering System	Example(s)
Numeric (one to 14 digital numbers)	1, 368. 0368, 1103, 30420730, 49896874989687
Numeric (with # prefix)	#188371
Numeric (with one or two leading zeros)	0368; 00368
Alpha (Text) only	Penn Main
Alphanumeric (+/- separators)	4000A; 4000-A; 4161H; 4161-H; 463.2
Alphanumeric (+/- spaces)	446120 Rev; 446120Rev
Concatenated (two numbers joined)	1928862, 4384863
With alpha prefixes	P00427
With alpha and numeric suffixes	1619-01; 1619G; 169-18; 169-18A-4
With Separators (-,; /)	1614-13; 1406-01-01096
With Separators (+/- spaces)	3592 – 3780; 3654-2020;
With Multiple Separators	0115-01-00411
With special characters	16477**?** ; "7038788 **&** 7042615"
With Brackets	159513(2)
With added text	137218 – Priority; 1502 ITEM 300; 165912 REV
With and Without Spaces	161277 – 2 and 161277-2 ; 2 4288E; 2 4529 F; 302E; 302-E-1; 302-E-2
Extended Multi-part names	"101688; 116051; 121919; 130004; 134616; 135862" "169585, 185913, 4384863"

Table 6-14: The number of gaps in PG&E's Job Number Sequences

Job File	No. of Sequence Gaps
0000-1000	600
1001-2000	687
2001-3000	684
3001-4000	477
4001-5000	0

Job File	No. of Sequence Gaps
5001-6000	842
6001-7000	748
7001-8000	883
8001-9000	907
9001-10000	920
Total	**6748 (67.5%)**

Table 6-15: Impact Statement: RM Processes (The Job Numbering Process)

IMPACT – RM PROCESSES – JOB NUMBERING PROCESS
The lack of consistent and quality assured numbering system for its Pipeline-related Jobs (and related job folders) leaves PG&E exposed to: • **Inability to locate safety critical pipeline information;** • **Poor decision making based upon incomplete information leading to costly and potentially fatal mistakes;** • **Poor management of safety critical assets;** • **Failure of its integrity management program;** • **Inaccurate databases, poor data quality and missing pipeline attributes;** • **Failure to comply with legal and business requirements;** • **Inefficient and ineffective information retrieval and time consuming searches;** • **Failure in its duty of care to maintain and retain records throughout their life-cycle; and,** • **Legal and fiscal penalties.**

GARP® Assessment Criteria – RM Processes – Job Numbering Process							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1	1	1	1	1	1	1.5	1.5

6.4.10. PG&E has not controlled the copying, distribution or evolution of its job folders

PG&E stated[144] that upon the completion of a job, copies of the relevant job folders were sent to the relevant mapping office, the gas transmission office in Walnut Creek and the Bayshore storage facility. This had not always been the case and the actual situation is not quite as simple as PG&E suggested. We are aware from our inspection and analysis of the Emeryville document catalog provided by PG&E[145] that a significant volume of job files have been copied, often more than once and distributed across one or more offices. While some of the copies have retained virtually identical contents with those stored elsewhere, others have not.

During our site visit PG&E engineers and construction staff stated that there was often as many as 20 different job folders for one job file. Our analysis of the Emeryville catalog revealed that number to be even larger. In some instances over 100 job folders exist for an individual job. In one instance, job 145418 has 1,347 related job folders that were originally distributed over 6 locations (Bayshore, Walnut Creek, Redding, Meridian, Beale, and Concord). While some folders are duplicated and copied to more than one group, not all job-related information is actually placed in a job folder, as different disciplines maintain different sets of job related information within their own working areas. In addition, some information may also be retained in personal files and e-mails.

At the time of this review, PG&E were unable to identify exactly how many 'duplicate' job files/folders existed, or where they were located prior to San Bruno. PG&E stated that

> "to date, PG&E has focused its efforts on collecting documents, adding the documents to ECTS, and using the documents to verify and validate the MAOP. The effort to date has not focused on eliminating duplicates or near duplicates. In the future, PG&E may identify and address duplicate and near duplicate documents in ECTS".[146]

The following two figures illustrate a discrepancy between the Emeryville and Walnut Creek data catalogs.

[144] Data Request CPUC_025 -01 (December 19, 2011)

[145] Data Request CPUC 048-01

[146] Data Request CPUC_025 -01 (December 19, 2011)

Figure 6-4: An illustration of the number of job folders held in each of the three main storage locations (Walnut Creek, Bayshore, and all other Offices) Based upon the ECTS Data Catalog.

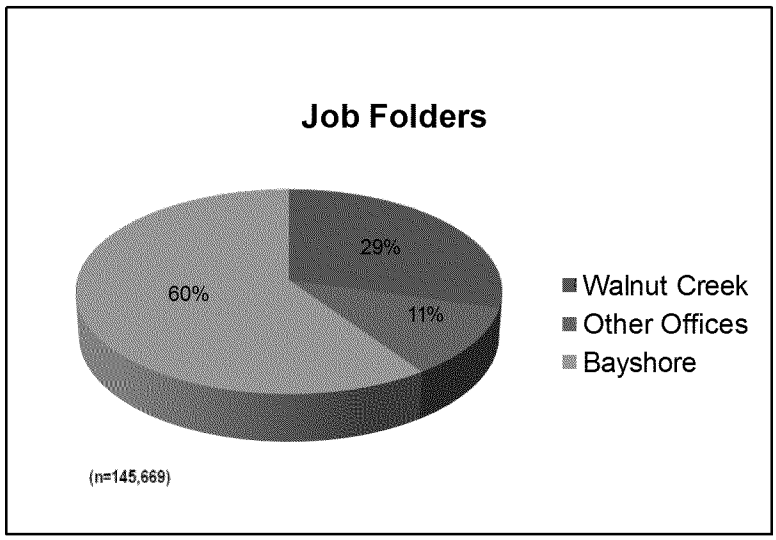


Figure 6-5: An illustration of the number of job folders held in each of the three main storage locations (Walnut Creek, Bayshore, and all other Offices) Based upon the Emeryville Data Catalog (February 2012)

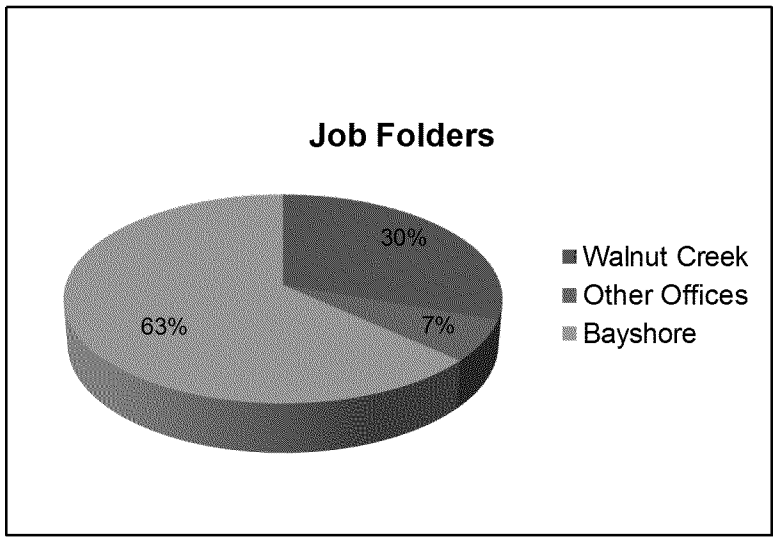


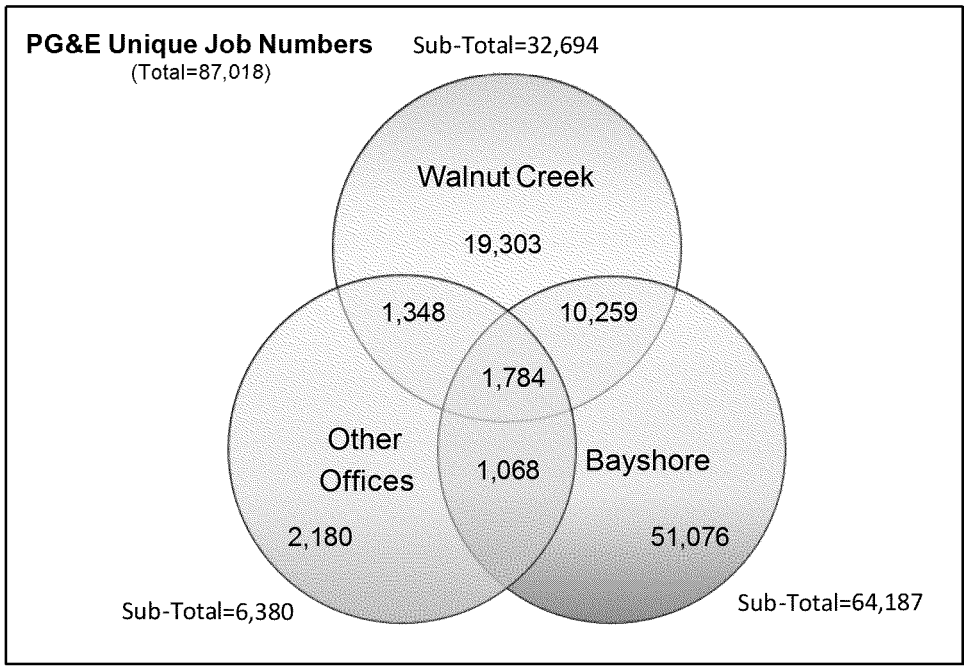
Table 6-16: Job Numbers and Job Folders (not held at Walnut Creek; and not held at Walnut Creek or Bayshore) as recorded in the Emeryville Database, February 2012

	Not Walnut Creek		Not Walnut Creek or Bayshore	
Unique job numbers	3248	3.7%	2180	2.5%
Job folders	5614	3.8%	2339	1.6%

Despite PG&E assurances that a master copy of all job-related folders were retained in the Walnut Creek engineering library, we identified a large number of jobs that had their corresponding job folders stored at more than 1 site, but not at Walnut Creek (3248 jobs in total). In addition, we noted from the figures provided by PG&E that there had been approximately twice as many jobs/job folders stored outside of Walnut Creek as there was at Walnut Creek prior to the MAOP Records Validation Project. A key point to note is that 2180 (2.5%) out of the 87018 unique jobs listed in the Emeryville had no corresponding job information stored job folders in either the Walnut Creek or Bayshore facility.

As any given job can comprise of multiple folders, stored across multiple locations it is difficult to visualize the different overlapping relationships that exist, without using a Venn diagram as illustrated below.

Figure 6-6: An illustration of Number of Unique Job Numbers defined in PG&E's Emeryville Data Catalog and their original source location prior to the MAOP Records Validation Project



Please Note: Other Offices=The 45+ PG&E offices outside of Walnut Creek and Bayshore.

Our provisional analysis of the listing of the job folders recorded in PG&E's Emeryville catalog[147] has revealed the extent of its job-folder duplication. Out of a total of 146,227 job folders listed in PG&E's Emeryville Catalog, prior to the MAOP project had:

- 92515 (63.3%) job folders were originally stored in Bayshore;
- 44262 (30.3%) job folders were originally stored in Walnut Creek;
- 9450 (6.5%) job folders stored in all other offices.

Out of 87,018 unique job numbers we identified in PG&E's Emeryville catalog:

- 51076 (58.7%) jobs stored in Bayshore only;
- 19303 (22.2%) jobs stored in Walnut Creek only;
- 10259 (11.8%) jobs stored in Walnut Creek and Bayshore;
- 2180 (2.5%) jobs stored in Other Offices only (e.g. not in Walnut Creek and Bayshore);
- 1784 (2.1%) jobs stored in Walnut Creek, Bayshore and at least one other office;
- 1348 (1.5%) jobs stored in Walnut Creek and at least one other office (excluding Bayshore);
- 1068 (1.2%) jobs stored in Bayshore and at least one other office (excluding Walnut Creek).

The widespread and uncontrolled duplication of job folders relating to a single job has an important impact on records management and potential safety implications, from a completeness perspective. For example, in order to obtain a complete set of records for any given job, wide ranging searches would have been required. Prior to the MAOP project, PG&E had:

- 12446 jobs with their job folders stored across 2 locations;
- 1711 jobs with their job folders stored across 3 locations;
- 293 jobs with their job folders stored across 4 locations;
- 45 jobs with their job folders stored across 5 locations;
- 8 jobs with their job folders stored across 6 locations;
- 4 jobs with their job folders stored across 7 locations;
- 1 job with their job folders stored across 10 locations.

[147] Data Request CPUC 048-1 (February,2012)

Table 6-17: All Job Numbers and Job Folders in (as recorded in the Emeryville Database, February 2012)

	Bayshore	Walnut Creek	Other Offices	Total
Unique job numbers	64187	32694	6380	87018
Job folders	92515	44262	9450	146227
Job folders (%)	63.3%	30.3%	6.5%	100.0%

A summary of our provisional analysis is presented in tables 6-17 and 6.18 above. This shows that only 22% of PG&E's job files were stored in Walnut Creek alone, i.e. they were not co-located in other offices. In addition, approximately 16% of all PG&E's job files were stored in multiple locations. Of these multi-location job files, 3.7% of the jobs and 3.8% of the job folders were missing from Walnut Creek.

During our analysis we noted that the dates recorded against the job folders in the Emeryville database varied from job to job, i.e. a single set of job folders for a unique job number had a range of dates recorded against them. We have assumed that these dates represent the most recent date recorded on documentation within the folder.

Given the distributed, multi-location nature of a proportion of the job folders we expected to see some variance (+/- 2-3 years) in the dates recorded per job. We were surprised to find that this variance was significantly larger than expected, with 3.3% of all jobs having folders with date range differences from 1 to 60+ years. The variability of the dates provided is illustrated in figure 6.7 below and impacts over 12% of the job folders where folder dates were provided. We infer from this that PG&E has a serious records management problem with either the control of the contents of its job folders; the quality control of its cataloguing process; or the uniqueness of its job numbering system over time. Due to the delay in receiving the catalog listings from PG&E, further investigation of this discrepancy was not possible.

PG&E's Internal Report[148] also highlighted other control-related issues including: the lack of "true ownership and accountability"; the fact that "processes do not necessarily address where information is collected, created, updated, shared between groups, stored in electronic systems, or disposed"; the "perceived lack of standards around processes and procedures results in inconsistencies around what information is included in job folders"; the fact that job folders "often contain duplicated and unnecessary information"; "the process of transferring job folders between groups/individuals is tedious and inefficient" and results in "lost time / inefficiency and potentially lost paperwork"; "Job folders scanned into SAP by RMC clerks may not be complete, do not always contain the final versions of documents, and may be unreadable or unusable, or not scanned at all"; "the process for closing out jobs is inconsistent at the Resource Management

[148] GasTransmissionSystemRecordsOII_DR_CPUC_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

Center (RMC) and in the field locations"; the "lack of standardization of job folder contents and the order of the documents"; the fact that "each office's practices for management and storage of job folders vary"; and that "duplicate job folders and thus duplicate information can potentially exist between Gas Transmission Records, Division Offices, Engineering, Construction, and Billing". PG&E's report also highlighted the fact that: "storage conditions of physical documents vary greatly from office to office (documents housed in boxes, file cabinets, desktops, inboxes, off-site locations, adjacent buildings, and external storage sheds/containers)"; and that the "location of certain records is often based on institutional knowledge of the local staff and varies from location to location".

Figure 6-7: PG&E Job Folder Age Variance (within any given job)

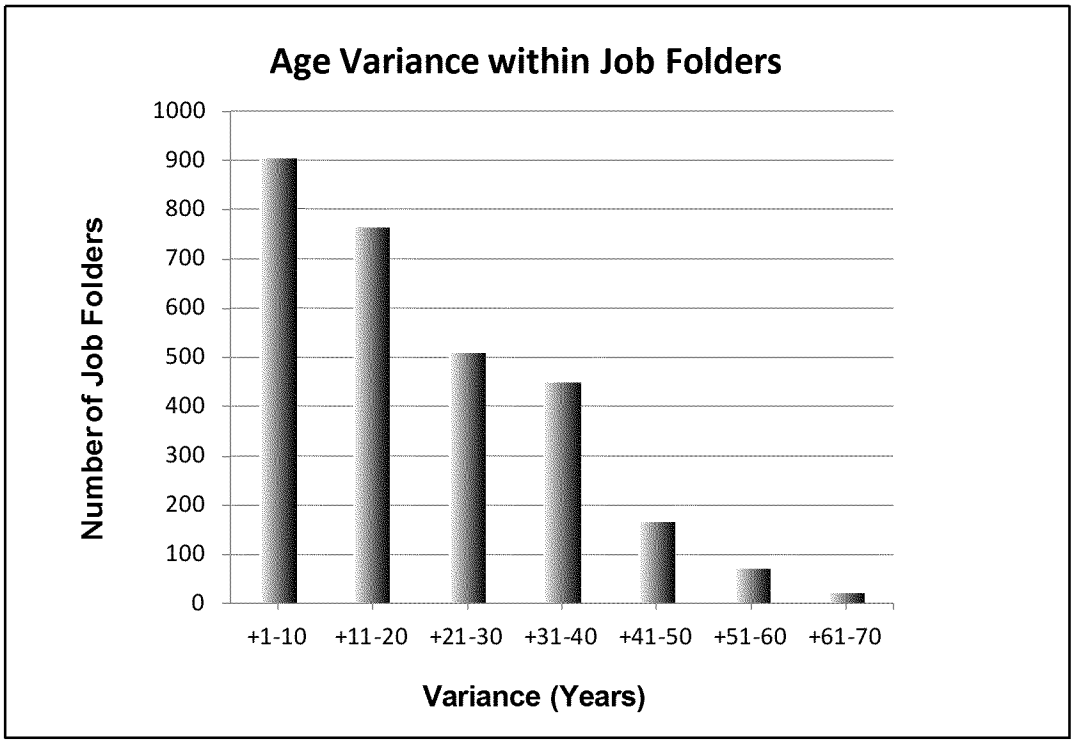


Figure 6-8: The evolution of a PG&E job and its accompanying job folders

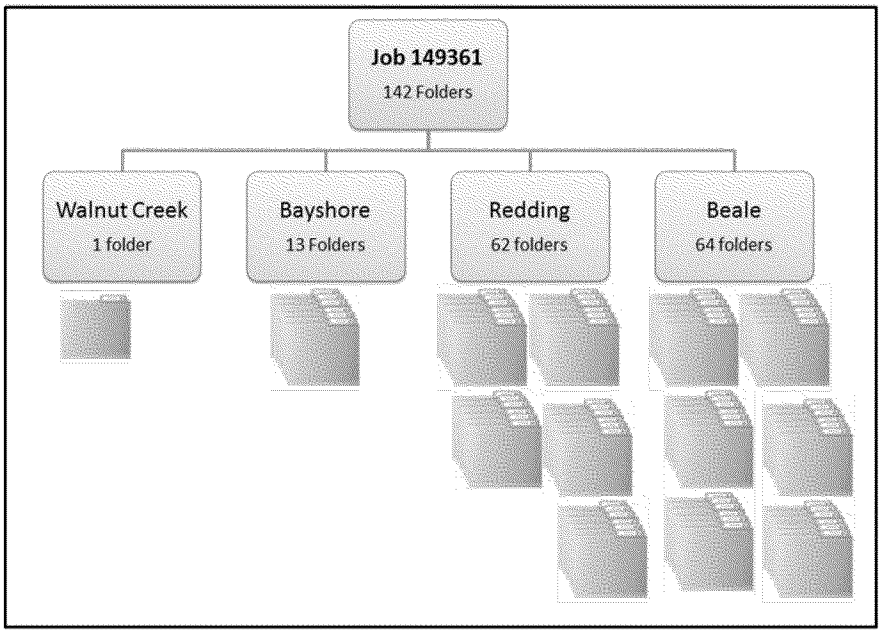


Figure 6-9: Frequency distribution of the number of PG&E Jobs Folders per Job

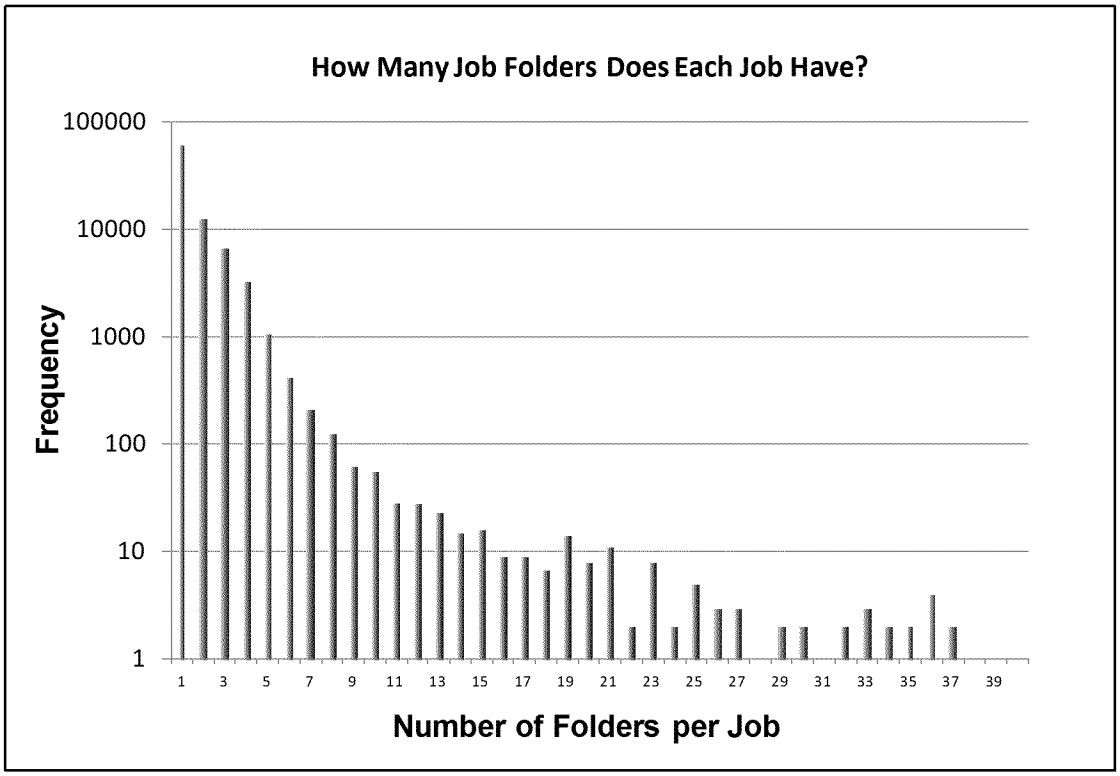


Figure 6.9 above, illustrates the frequency distribution of jobs with 1 or more corresponding job folders. As you will see from this diagram (presented on a logarithmic scale) the majority of all jobs have less than 5 job folders allocated to them, however there is still a significant number of jobs with 6 or more job folders.

Given our findings in this report, our analysis of the PG&E job folder catalog and PG&E's own findings we believe that PG&E's approach to records management can only be described as 'evolutionary'[149] in as much as it allowed duplicated copies of job folders to evolve and develop their contents in isolation from one another in the various offices/storage locations in use. While diversity and natural selection forms the unifying concept in the life sciences, the same cannot be said for engineering records.

It was not acceptable for copies of PG&E's Job folders to reside in multiple locations and develop different vintages of content for the same job, without any feedback mechanism to update the 'Master Job folder' with the relevant documentation. The evidence for such widespread diversity, is clear from the document catalogs provided by PG&E and the wide range of end dates recorded in different job folders stored in different locations relating to the same job. All of these factors have records management implications that could have a direct impact upon safety.

Table 6-18: Impact Statement: RM Processes (Duplicate Job Files and Folders)

IMPACT – RM PROCESSES – DUPLICATE JOB FILES AND FOLDERS
The lack of control over the duplication, distribution and storage of Pipeline-related Job Files and folders leaves PG&E exposed to: • **Inability to locate safety critical pipeline information;** • **Poor decision making based upon incomplete information leading to costly and potentially fatal mistakes;** • **Poor management of safety critical assets;** • **Failure of its integrity management program;** • **Inaccurate databases, poor data quality and missing pipeline attributes;** • **Failure to comply with legal and business requirements;** • **Inefficient and ineffective information retrieval and time consuming searches;** • **Failure in its duty of care to maintain and retain records throughout their life-cycle; and,** • **Legal and fiscal penalties.**

GARP® Assessment Criteria – RM Processes – Duplicate Job Files and Folders							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1	1	1	1	1	1	1.5	1.5

[149] Darwin, C. (1859) On the Origin of Species, Publisher John Murray, 502pp.

6.5. Storage

It was difficult to assess the range of records storage facilities used by PG&E at the time of the San Bruno Pipeline rupture and fire, because PG&E had already undertaken a significant document consolidation and transfer exercise prior to this review, as part of its MAOP validation project. Hence, this review of "as-was" records storage is based upon an analysis of the catalogs and reports provided by PG&E, as well as site visits to a number of PG&E's facilities.

6.5.1. Prior to San Bruno PG&E had lost control of its physical records storage

Within the PG&E Gas Transmission Division, prior to the San Bruno pipeline rupture and gas fire, there was no single, central document storage facility that held a complete and comprehensive collection of all pipeline-related job files and folders.[150] PG&E had adopted a decentralized approach to records management within the Gas Transmission Division. While the Walnut Creek facility hosted the main engineering library and most drawing records, numerous local-held document stores existed in each of the Gas Transmission Offices. While a decentralized approach for document storage is not uncommon, the lack of a comprehensive index for all its historical pipeline records was a major deficiency in PG&E's record management strategy, and may help to explain why it had taken so long to identify key records and job files associated with the San Bruno incident.

During the post San Bruno MAOP Records Validation Project pipeline related job folders were located in over 44 separate PG&E offices and stores (See table 6-19 and 6-20 overleaf). Both the lack of any form of central index and the number of different office locations where job folder records were stored were major barriers to efficient retrieval of pipeline records. The absence of a central index or records catalog meant that is not clear what pipeline-related documentation was held, where or by whom, or more importantly where the master set of documentation was held.

In December 2011, despite all of the work undertaken in the intervening period as part of PG&E's MAOP Records Validation Project, PG&E stated[151] that it still did not know how many job folders were currently stored in each location. Specifically, it noted, "To collect this information, PG&E would need to physically inventory and examine the folders in all locations and compare the findings against the folders in Emeryville and the folders that remain in the local offices that were scanned on site. Such an inventory has not yet been done".

[150] PG&E uses the term "file" to refer to the collection of documents regarding a particular capital job number. Each PG&E "file" may consist of multiple physical folders that contain documents.

[151] Data Request CPUC_025-01 (December 19, 2011)

Table 6-19: Storage locations holding records necessary for PG&E MAOP Records Validation Project[152]

PG&E Facility Visited	
Antioch	Napa
Auburn	Newman
Bayshore	Oakland
Beale	Petaluma
Bakersfield	Redding
Chico	Rio Vista
Concord	Rocklin
Cupertino	Sacramento
Daly City	Salinas
Emeryville	San Carlos
Eureka	San Francisco
Fresno	San Jose
Hayward	San Rafael
Hinkley	Santa Cruz
Hollister	Santa Rosa
Los Medanos	Stockton
Manteca	Tracy
Martin SC	Ukiah
Marysville	Vacaville
Merced	Walnut Creek
Meridian	Willows
Modesto	Vallejo
Monterey	**n=44**

PG&E reported[153] that during the MAOP Records Validation Project 136,241 job folders were transferred to Emeryville for processing. More than one year after it began this exercise,[154] PG&E still had approximately 875 boxes in Emeryville containing an unknown number of job folders to be processed and inventoried. The number of folders transferred to Emeryville from each of the offices is presented in table 6-20 overleaf. PG&E also reported that 9,428 job folders had been scanned in the District offices rather than being transferred to the Emeryville Records Center. (See table 6-21).[155]

In February 2012, PG&E provided us with a copy of their Emeryville data catalog containing Barcode, Box, Job Number and Date information for 146227 job folder records relating to approximately 87,000 unique job numbers. PG&E are aware that they have more unique job numbers that actual jobs and have identified this as a data entry error. For example, job folders

[152] MAOP Records Validation Project, Data Request CPUC_025 -01 (December 19, 2011)

[153] Data Request CPUC_025 -01 (December 19, 2011)

[154] PG&E provided this information as of December 19, 2011. Data Request CPUC_025-01 p6

[155] The PG&E figures are based upon a review of documents in their ECTS system.

citing a job number prefixed with a zero ("0") have been treated as a different job to that without a "leading zero". Thus PG&E unique job numbers do not necessarily correlate with the number of actual jobs. The 'ghost' jobs, i.e. job folders with real documents, but allocated to an incorrect or ghost number, will directly impact PG&E's integrity management program if they are allowed to cascade through PG&E's information systems un-checked. For the purposes of this review, we have simply analyzed the information provided by PG&E from their Emeryville catalog that have been developed to support the MAOP Validation and Verification project.

In order to make some meaningful comparisons within the data provided by PG&E a small data clean-up was undertaken in an remove some of the inherent data quality problems and standardize office locations in the Emeryville data catalogue. For example, records labeled: "Bay shore" was renamed to "Bayshore"; "Bay" was renamed to "Bayshore"; "Bayshore via WC" was renamed to Bayshore; "Beale?" was renamed to "Beale"; "Oakland Coliseum" was renamed to "Oakland"; "Sac" was changed to "Sac-Gene"; "GTCxxx" was changed to "GTC"; "Walnut Creeek" was changed to "Walnut Creek"; "Wigit" was changed to "Walnut Creek" and "WC" was changed to "Walnut Creek".

Of these 63.3% of the job folders are held in Bayshore, 30.3% in Walnut Creek and 6.4% were distributed across the remaining 42 locations. We note that of the folders transferred to Emeryville, 339 of them (classified as "Other") originated from a variety of sources, including former employees. We assume that these files were inadvertently retained by former employees in their homes, and only surrendered to PG&E in the aftermath of the San Bruno Incident.

In response to a specific data request,[156] PG&E stated that it could not provide an estimate of the number of job folders located outside the Emeryville facility because the MAOP Validation and Verification Project was still underway. This response masks the fact that prior to San Bruno, PG&E did not, and still does not have a control system in place to catalog and track all physical job folders in all gas transmission offices. If it had, this should have been a simple and straightforward question to answer. As part of the MAOP Validation and Verification project, PG&E is scanning all job file documents that can be used to verify and validate the maximum allowable operating pressure (MAOP) for its transmission system. In the process, PG&E is creating as complete a list as possible of the jobs associated with the routes/lines in ECTS. PG&E is then tagging the jobs used to support the Pipeline Features List ("PFL"). All of the jobs in ECTS, and all the tagging information related to the PFL, is planned to be migrated to a permanent corporate repository that will replace ECTS.

[156] Data Request CPUC_025 -01 (December 19, 2011)

The technology and systems that will be used to support the new record-management efforts are discussed in the Gas Transmission Asset Management project ("GTAM").[157] For additional information on GTAM, please see Chapter 5 of the Pipeline Safety Enhancement Plan, submitted on August 26, 2011, in Order Instituting Rulemaking 11-02-019.

[157] Further information on GTAM is provided in Chapter 5 of the Pipeline Safety Enhancement Plan, submitted on August 26, 2011, in Order Instituting Rulemaking 11-02-019.

Table 6-20: Folders Transferred to Emeryville as part of the MAOP Records Validation Project

Source Location	Number of Folders
Bayshore	86846
Walnut Creek	42771
Beale	1660
Sacramento	1019
Salinas	503
Other	339
Auburn	224
San Rafael	224
Stockton	202
Milpitas	196
Fresno	189
Hayward	185
Concord	175
Newman	159
San Jose	148
Modesto	132
Santa Rosa	128
Redding	127
Merced	106
San Carlos	105
Bakersfield	103
Oakland	94
Petaluma	89
Chico	70
San Ramon	63
Santa Cruz	59
San Francisco	44
Eureka	40
Vallejo	34
Ukiah	30
Napa	24
Marysville	22
Emeryville	21
Cupertino	20
Willows	17
Antioch	15
Martin SC	11
Hollister	9
Monterey	9
Meridian	8
Vacaville	7
Richmond	6
Rocklin	5
Hinkley	2
Manteca	1
Grand Total	**136,241**

Table 6-21: job folders Scanned Onsite in PG&E Offices, but not transferred to Emeryville

Location	Job Files
Sacramento	1739
Auburn	678
Salinas	639
Santa Rosa	591
Fresno	535
Merced	474
Stockton	465
Bakersfield	452
Modesto	370
Edenvale (San	353
Chico	348
Belmont (San Carlos)	332
Rio Vista	326
Hayward	302
Napa	296
Concord	282
Oakland	216
Redding	207
Eureka	186
San Francisco	171
Vallejo	154
Cupertino	148
Ukiah	58
Richmond	52
Other	32
Milpitas	13
Meridian	7
Hinkley	1
Walnut Creek	1
Grand Total	**9428**

The table above shows the number of job folders scanned and retained on site in PG&E offices, rather than transferred to the central Emeryville store (as of December 19, 2011).

6.5.2. PG&E's approach to storage has led to a range of records management problems[158]

In the present proceeding, PG&E has identified the term "master job file" or "master job folder", and used those terms "to differentiate a job file or folder that contains original documents".[159] PG&E considered the completed set job files stored in its Walnut Creek engineering library to be the "master job files", which it also calls "official files. The findings of this study clearly demonstrate that the Walnut Creek engineering library did not maintain a complete, consistent and comprehensive set of pipeline related job folders at Walnut Creek".[160] Several examples are presented below to illustrate this point.

Example 1: Job 98015: While many jobs hold their records in only one or two corresponding job folders, jobs such as Job 98015 (Line 132) have pipeline records stored in 94 job folders none of which were located in PG&E's Walnut Creek Office or Engineering Library. Of these folders 91 were in Bayshore, and the remaining three split between San Francisco and San Carlos. PG&E's recent data response shows that this job should have been recorded in a master job folder in Walnut Creek.

Example 2: Job 137218: While many jobs hold their records in only one or two corresponding job folders, jobs such as Job 137218, have pipeline records stored in multiple job folders (n=188) unevenly distributed across multiple offices. For example, prior to San Bruno, job 132718 had its records stored in Bayshore (127 folders), Eureka (2 folders), Chico (3 folders), Redding (1 folder) and Walnut Creek (55 folders). While we have not examined the contents of the job folders it is apparent that there must be an additional significant volume of information in the job folders held in Bayshore than in either of the other four offices. What is not clear, however, without examining each and every one of the 188 folders in detail, is exactly how much of the content is duplicated, how much overlap exists between each of the job folders (especially Walnut Creek and Bayshore), or which office the Bayshore records originated from. This example illustrates how the job folders in each office have evolved and developed separately from one another. The dangers in this approach to record keeping should be quite apparent. If anyone working in Redding, Eureka or Chico had consulted their local job folders relating to job 132718, they would have obtained a very different picture from someone reviewing the information available at Walnut Creek or Bayshore on the same job. Even an engineering review of the extensive Walnut Creek Collection would probably not reveal a complete picture of the information available. While this illustrates problems with incomplete files, the bigger concern

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[158] The National Transportation Safety Board Stated, "Based on its records search and the characteristics of the accident pipe, including the numbers painted on the inside of the DSAW long joint south of the pups, PG&E indicated its belief that the pipe at the location of the rupture was most likely manufactured by Consolidated Western in 1948, 1949, or 1953 and was originally purchased for Line 153, Line 131, or the 1948 Line 132 project." Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire San Bruno, California September 9, 2010, P. 28. These examples suggest that PG&E has lost control over many of its records, which puts the integrity of PG&E's records search in question.

[159] See PG&E response to Data Request 51, Question 5.

[160] See PG&E response to Data Request 17, Question 5 (Supp.); See also PG&E response to Data Request 51, Question 4a.

for PG&E to address in this matter would be to identify and systematically catalog which set of folders to trust as the definitive, traceable and verifiable 'master' source of information relating to this job. While the number of folders in Eureka, Chico and Redding are small, they may hold important, safety critical information unique to this job.

While PG&E has stated that Walnut Creek should have hold held a definitive "master set" of records for this job,[161] the document control process was not apparent. Given significant difference in the number of folders in each office, we can be confident in our assumption that the job folders for job 132718 were NOT maintained in parallel with each other. If they had, there would have been a similar number of job folders in each office. In addition, the fact that there is at least 73 more folders of job related documentation at Bayshore than at Walnut Creek raises further concerns about incomplete documentation held in the Walnut Creek office.

Without a complete consolidation and review of all available documentation in each of the 187 job folders, it is unlikely that PG&E would have been able to establish a complete, traceable and verifiable set of information for this job. While this example only discussed the merits of 187 job folders, it is worthwhile placing this in context of PG&E's entire gas pipeline records collection. As we stated earlier in section 6.4, PG&E have over 87,000 Jobs and 146,000 job folders. The lack of document control over the last 60 years has created a major records management problem for the organization to address, the size and scale of which is only now becoming apparent.

Example 3: Job 152541: A more typical example of this issue would be Job 152541 with files unevenly distributed across three sites: Walnut Creek (1 Job Folder), Auburn (1 Job Folder) and Concord (14 job folders). While we have not examined the contents of the job folders, given there are fourteen times as many job folders in Concord as there is at Walnut Creek, we infer that that there should be significantly more information also. While it is not clear exactly how much of the content is duplicated or how much overlap there is between the two sets of job folders, we can be relative confident that the two sets of job folders developed separately of one another. This is a further example of the completeness issue. However, in this instance there is far more information on a job located in the local Concord office than at Walnut Creek. Here again, it would be difficult to establish which set of folders to trust as the definitive, traceable and verifiable 'master' source of information relating to this job within examining the contents of each of the folders in detail. A more pronounced example of the issue above would be Job 149361 with 142 files unevenly distributed across four sites: Walnut Creek (1 Job Folder), Bayshore (13 job folders), Redding (62 job folders) and Beale (64 Job folders).

Example 4: Job 4117C: This job comprises of 4 job folders, split across 3 sites: Walnut Creek (2 folders), Sac-Gene (1 folder) and Bayshore (1 folder). While the document volumes are not as

[161] See PG&E response to Data Request 17, Question 5 (Supp.); See also PG&E response to Data Request 51, Question 4a.

great a concern in the two previous examples, there is a significant variance of 26 years in the information contained in the date field. This problem is discussed at length in section 6.4.10 and illustrated in Figure 6.4. We infer from this one or more of several problems for PG&E. First PG&E may have lost control of the contents of its job files. In this case, that would mean that information has continued to be added to the job file in Sac-Gene for 26 years after the job was initiated. Second, PG&E may not have quality control of its cataloguing process. Here, that could mean that PG&E did not enter the date 1980 or 1954 correctly. Third, PG&E's job numbers have lost their uniqueness over time. In this case, PG&E may have used Job number 4711C twice, once in 1954 and once in 1980. Due to the delay in receiving the catalog listings from PG&E, further investigation of this discrepancy was not possible.

Example 5: Job 4597C: This job comprises of 10 job folders distributed across 9 sites, including: Bayshore (2 folders); San Carlos; Hayward; Eureka; Chico; Petaluma; Santa Cruz; Salinas; and Redding, but not Walnut Creek. This job illustrates a number of the points discussed above including the widespread duplication of job folders and their contents, and an age range from 1936 to 1979. The folder data is included below to illustrate the variable nature of the records.

Table 6-22: Extract from the Emeryville Catalog for Job 4797C

Barcode	Job	Box	Source	Date
jfn61730	4597C	GTC023	San Carlos	1936
JFN61498	4597C	GTC002	Hayward	1954
JFN08873	4597C	GTC079	Eureka	1962
JFN08324	4597C	GTC077	Chico	1970
jfn48704	4597C	GTC014	Petaluma	1971
JFN02867	4597C	GTC029	Santa Cruz	1974
jfn115033	4597C	BAY6031	Bayshore	1974
JFN119285	4597C	GTC2045	Salinas	1974
JFN62601	4597C	GTC078	Redding	1977
JFN110270	4597C	BAY5800	Bayshore	1979

Example 6: Job 145418: This job comprises of 1,347 job folders distributed across 6 sites, including: Bayshore (1191 folders); Walnut Creek (135 folders); Beale (14 folders); Concord (3 folders); Meridian (2 folders); and Redding (2 folders). This job illustrates the widespread duplication of large collections of job folders relating to a single job and an age range from 1959 to 1971.

Example 7: Top 20 Jobs: Table 6-23 below provides a list of PG&E's top 20 jobs in terms of the number of job folders per job. The table illustrates the size and distribution of the largest PG&E document collections relating to specific jobs stored in Walnut Creek, Bayshore and/or other offices. It is worth noting the variation in storage locations for the bulk of the collection; and the wide vintage of documents reported by PG&E within the folders.

Table 6-23: PG&E's Top 20 Jobs in terms of Job folders (based upon PG&E's Emeryville Catalog (February 2012)

Job Number	Walnut Creek Folders	Bayshore Folders	Other Offices Folders	Total Folders (per job)	Earliest Date	Latest Date	Range (years)
145418	135	1191	21	1347	1959	1971	12
175670	234	412	0	646	1971	1972	1
101688	15	350	4	369	1948	1959	11
1956176	148	216	3	367	1989	1994	5
121919	48	179	4	231	1952	1954	2
178608	184	18	0	202	1972	1974	2
153568	2	194	2	198	1962	1963	1
158887	15	146	27	188	1968	1974	6
137218	55	127	6	188	1956	1958	2
148721	7	171	2	180	1960	1960	0
149361	1	15	126	142	0	0	0
162548	2	131	0	133	0	0	0
172747	31	98	2	131	1969	1970	1
135862	4	126	1	131	1957	1957	0
179810	93	37	0	130	1973	1975	2
116051	2	120	3	125	1952	1953	1
134734	26	3	82	111	1956	1956	0
98015	0	91	3	94	1948	1948	0
134616	60	31	2	93	1956	1974	18
161277	1	84	5	90	1964	1968	4
-	**2896**	**4472**	**778**	**8146**	-	-	-

Table 6-24: Impact Statement: Physical Storage

IMPACT – PHYSICAL STORAGE
The decentralized approach to records storage adopted within the Gas Transmission Division and the lack of a central index of the distributed job folders and allied documentation leaves PG&E exposed to: • **Inability to locate safety critical pipeline information;** • **Poor decision making based upon incomplete information leading to costly and potentially fatal mistakes;** • **Poor management of safety critical assets;** • **Failure of its integrity management program;** • **Inaccurate databases, poor data quality and missing pipeline attributes;** • **Failure to comply with legal and business requirements;** • **Inefficient and ineffective information retrieval and time consuming searches;** • **Failure in its duty of care to maintain and retain records throughout their life-cycle; and,** • **Legal and fiscal penalties.**

GARP® Assessment Criteria – Physical Storage							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1	1	1	1	1	1	1.5	1.5

6.5.3. Deficiencies with the PG&E Gas Transmission Division Engineering Library, Walnut Creek

PG&E had no definitive view, or a single master source of information, relating to each of their pipeline-related assets. This information is distributed across the organization in localized silos of information, that are often unconnected, poorly catalogued with little referential integrity between the various collections. Historically, there has been very little integration between different cataloging tools and indexes used within PG&E and as such, it was difficult for staff outside of the Walnut Creek Records Center to undertake effective searches for pipeline-related documents.

During our field visit to this office and a walk-through of the search and retrieval processes we were surprised by the convoluted processes used to access pipeline information within the Walnut Creek Records Center. Information was accessed by manually undertaking a geographic search through a hierarchical system of plat maps, index sheets and alignment drawings in order to identify the specific drawings and job folders of interest. Despite all drawings being revisited and bar-coded in the 1990s, insufficient metadata has been captured to enable an electronic search for all relevant pipeline drawings, job folders or other information, for different pipeline, segment or facility.

During this review we were concerned by the large number of overlapping systems used to manage the physical and electronic records within the Gas Transmission Division, the poor referential integrity[162] that exists between the respective catalogs, and the overall level of completeness and consistency of the records themselves. This is confirmed, at least in part within PG&E's Internal Report[163] in which PWC state that: "The systems are not well integrated, contain duplicate information, and have significant data integrity (accuracy and completeness) issues"; "many offices had no knowledge of ECTS. For those offices aware of ECTS, all reported issues with the usability of the front end, search functionality, poor quality of scans, duplicate information, missing information and other issues"; "processes do not necessarily address where information is collected, created, updated, shared between groups, stored in electronic systems, or disposed"; "each office's practices for management and storage of job folders vary" and that the "physical security of documents is inadequate"; and last but not least "the location of certain records is often based on institutional knowledge of the local staff (which) varies from location to location".[164]

[162] In lay terms, referential integrity is the ability to share information from one system to another, by reference to common, quality controlled identifiers, such as a job number.

[163] GasTransmissionSystemRecordsOII_DR_CPUC_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

[164] GasTransmissionSystemRecordsOII_DR_CPUC_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

6.5.4. Deficiencies with the PG&E Metallurgical Testing Library and Archive, San Ramon

PG&E's Materials Chemistry Support Group (known as ATS) comprises of a group of chemists and metallurgists with extensive corrosion experience based in the San Ramon Office. This group provides welding and non-destructive engineering inspection services (including ultrasonic, field etching and field chemistry services, in addition to more traditional metallurgical analysis). While this group can provide support to all PG&E divisions, the bulk of its work prior to San Bruno was centered upon the electrical and nuclear divisions.

ATS informed us that before San Bruno, individual divisions were allowed to contract inspection work to outside third parties and bypass ATS services completely. For example, 100% of the analytical investigations undertaken as part of PG&E's Gas Transmission Division Integrity Management program were undertaken by third-party contractors. Analytical jobs undertaken or commissioned by PG&E's analytical division (ADT) based in San Ramon have been tracked for the last 20 years using their laboratory information management system (SWIMS) and the resulting analytical results have been stored in an allied Reports System. In addition ADT also maintains a records library of their historical analytical investigations.

During our interviews with staff it was reported that not all of the output records from PG&E analytical studies are copied to the ADT Reports Library for long-term storage. If the metal failure analysis was conducted by an outside company rather than at PG&E's San Ramon facility, the report would not be at San Ramon and might not be at the company. This factor may explain why PG&E has been unable to locate, at San Ramon or elsewhere, the metal failure reports for two previous major incidents that are clearly relevant to integrity management of line 132: It also may explain PG&E's failure to locate the metal failure report related to the 1963 explosion on line 109 on Alemany Blvd. in San Francisco which apparently contributed to the heart failure death of one fireman and caused serious injury to another. Further, this factor may explain PG&E's inability to locate the metal failure report related to the 1988 longitudinal weld failure on line 132, which fortunately occurred without injury to persons or property.

In addition, on the basis of the partial figures provided by PG&E during our site visit of this facility, we estimate that approximately 17% (13,228) of the analytical investigation reports recorded in the ATS information management system do not have corresponding records in their analytical reports library. This highlights the fact that the analytical reports library is incomplete, and that there has been little direction from senior management to improve this situation.

Table 6-25: The number of analytical reports missing from the ATS Report Library

	Analytical Jobs (SWIMS)	Analytical Reports (Reports Library)	Missing
Calibration reports	-	**47,132**	
Analytical investigation reports	-	**17,391**	
Total	**77,749**	**64,523**	**13,228**

Table 6-26: Access pathways to the ATS Reports Library

Library Catalog Type	Period covered	Contains	Search Type
Hardcopy binder	1915 to 1995	Index only	Manual search of index
Electronic database	1995 to date	Details of originals, copies and offsite copies	Full attribute search

During our site inspection it was reported that accessibility by other parts of PG&E to the analytical inspection report library was poor. Several factors may help explain this. First, there is no online access or integration with other key Gas Transmission Division record-keeping systems such as PSRS, ECTS or the integrity management team. Second, key metadata from 1915 to 1995 has not been digitized and such records are only accessible via a manual search. Even then, this assumes that PG&E had some understanding or information relating to the records they needed in the first place. Another problem with the ADT Reports library has a material impact upon PG&E's integrity management inquiries. While the Dewey Decimal coding system is used to identify Gas Transmission Division reports (Code 006.3) it did not allow the reports to be subdivided into transmission or distribution subsets. For example, while analytical inspection reports relating to 781 gas leaks were identified, there was no way from the available manual catalog to identify if these were gas transmission or gas distribution based-studies without a time consuming, manual cross-referencing exercise.

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At present, PG&E Gas Transmission Division staff can commission metallurgical testing and inspection work with an existing third-party without having to inform the ATS unit, or provide copies of the resulting analytical reports for the archive. There is no policing of the completeness of the records held in the ATS library. Furthermore, there is no standard set of location metadata required to be supplied with the test reports, as such it is difficult to reference individual spatially reference individual studies to specific pipeline locations, without reference to the related job files. There are many reasons why there is a shortfall in the number of analytical reports stored by ATS: Such reports may have been retained by the engineer, or transferred directly to the relevant job file. The lack of a process to follow up missing reports and ensure complete and comprehensive set of records should have been a concern, prior to San Bruno, and remains an issue today. In an environment with an ageing infrastructure, it is likely that PG&E will need to do more inspection and testing not less. As such, the logic of employing external third parties to undertake material testing, without reference to, or QA/QC by PG&E's own team of domain specialists needs to be questioned. Also the failure to keep and maintain all gas pipe failure metallurgical reports in San Ramon, regardless of whether the report was written in–house or by outside vendor, creates a serious record-keeping deficiency.

6.5.5. The PG&E Integrity Management library, Walnut Creek

It was not clear if the integrity management team at Walnut Creek was aware of the depth and breadth of the analytical information available within PG&E's Materials Chemistry Support Group's archive, as only a fraction of the archive catalog had been transcribed to a database. The ATS library provides a potentially useful source of relevant information for PG&E's integrity management team. We understand that 100% of the integrity management metallurgical studies have been undertaken by external vendors rather than PG&E's own metallurgical laboratory and that the results of these studies were copied to the engineer and the Integrity Management Library at Walnut Creek. Copies were not lodged with the Materials Chemistry support group for reference or archival purposes.

Table 6-27: Impact Statement: Storage (Document Libraries)

IMPACT – STORAGE - LIBRARIES
The lack of a central catalog of all pipeline-related records and the existence of multiple decentralized and disconnected document libraries and record stores leaves PG&E exposed to: • **Inability to locate safety critical pipeline information;** • **Poor decision making based upon incomplete information;** • **Poor management of safety critical assets;** • **Failure of its integrity management program;** • **Inaccurate databases, poor data quality and missing pipeline attributes;** • **Failure to comply with legal and business requirements;** • **Inefficient and ineffective information retrieval and time consuming searches;** • **Failure in its duty of care to maintain and retain records throughout their life-cycle; and,** • **Legal and fiscal penalties.**

GARP® Assessment Criteria – Storage – Libraries							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1	1	1	1	1	1	1.5	1.5

6.6. Technology Problems

PG&E utilizes a range of systems to manage its projects, catalog it documents and store its information. These systems are not well integrated, contain duplicate information, and have significant data integrity (accuracy and completeness) issues associated with them.[165]

6.6.1. Electronic Records Storage Deficiencies

It has never been easier to create, print and distribute documents within than it is today. Tools such as Microsoft Office and Outlook have simplified this task considerably. However, the freedom they allow has also created a major records management problem. As demonstrated in the previous section and reiterated in PG&E's Internal Report[166] all too often within PG&E no one knows what job folders exist, where the original is, where the master is stored or what its provenance was. The electronic document management applications used within PG&E Gas Transmission division fall broadly into four categories:

- Local file stores which hold the documents electronically but which hold no information about the documents (e.g. share areas on fileservers)
- Project Tracking Systems holding data (metadata) documents
- GIS Systems which hold data about the documents (metadata) as well as pipeline attributes
- Data Catalogs which hold metadata about the documents, folders and boxes held

PG&E's various repositories for pipeline related and safety critical engineering drawings maps (EMS, ELS, GIS, ECTS, and Job Files) are documented in the response to Data Request 09.[167] PG&E does not maintain a central hardcopy archive of all its current pipeline related and or safety critical engineering drawings maps, reports and job files.[168] Current pipeline drawings, maps, and records are maintained in electronic format with the exception of redline as–built drawings, which are maintained in hardcopy format. Station information is maintained as a combination of hardcopy and electronic information.

It is clear from our preliminary review of both the Emeryville and ECTS data catalogs and the data entry errors that they contain, that the systems have inadequate front-end data validation and verification, and insufficient data quality consistency checks (as evidenced from the diversity and scale of the data quality error reported earlier in this section). PG&E's records catalogs have

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[165] GasTransmissionSystemRecordsOII_DR_CPUC_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

[166] ibid

[167] Data Request CPUC_009 –Q01.

[168] Data Request CPUC_025 -02 (January 3, 2012)

been developed in a somewhat ad-hoc manner, and would benefit from greater referential integrity with other more trusted information sources, a common data model and metadata schema, common cataloging standards and process; and standardized pick lists/control lists wherever possible, in order to remove, or at least reduce the incidence of manual keyboard error.

6.6.2. Shared Drives

A wealth of information is stored in a relatively unstructured and uncontrolled manner on the technical drives. Much of this information is not regarded as a strategic asset, by those who maintain it. Data and documents are distributed across a range of different shared drives and functional silos, and duplication is widespread. PG&E confirmed as much in the PG&E Internal Report[169] and that stated that "Shared Drives are used by many groups to store legacy data or duplicative data that may also be in SharePoint or other systems, as it is easier and more convenient for staff to access"; "SharePoint has not been fully developed. It is used as another shared drive in most cases, albeit more cumbersome and difficult to use than a share drive"; "lack of collaboration across sites is a challenge"; both "paper and electronic records can be difficult to locate from office to office because of the unique process each office has created to ensure (their staff) have access to the information they need". While localized folder structures are continuously evolving within these silos, there did not appear to be a formal mechanism for overseeing or documenting new folder structures, file-plans, or business classifications schemes. Moreover, there was no apparent means of ensuring that important records collections located on shared drives are being managed consistently by the teams concerned.

6.6.3. Electronic Document Management System Deficiencies

In addition to its "electronic document catalogs," PG&E uses a number of "electronic document management systems", "electronic databases" and Geographic information systems. These systems serve as enterprise business solutions and support a multitude of business needs, including tracking jobs and storing information about jobs and documents. The functionality of these systems exceeds those of a standalone, traditional "electronic document catalog" while still possessing catalog-type functionality. PG&E's "electronic document management systems" and "electronic databases" were discussed in PG&E's responses to Data Request Nos. 21-7 and 21-8. While EDMS technology is well tested, understood and implemented company-wide in many other oil and gas companies, PG&E is only just beginning to exploit this technology. Document management systems such as Documentum, not only provide the means to search content using search engines familiar to users of the Internet, but also provide security, access control, version control and other attributes required in a fully functional document and records management system capable of meeting current and future legal and regulatory requirements. It is worth noting that PG&E made a significant investment in electronic document management systems in

[169] GasTransmissionSystemRecordsOII_DR_CPUC_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

its Nuclear Division by procuring Documentum for use in its Engineering Document Control activities. This system has the capacity to be used as a central platform for more robust document and records management within the Gas Transmission Division. We were informed that PG&E had already decided upon Documentum® as their main corporate EDMS system, and that over time existing systems such as ECTS would be migrated to this platform.

Table 6-28: Impact Statement: Technology (Electronic Document Storage)

IMPACT – TECHNOLOGY – ELECTRONIC DOCUMENT STORAGE
The absence of a single, searchable, readily accessible and fully populated electronic document and records management system (EDRMS) that stores, manages and controls all pipeline-related documentation within the Gas Transmission business, throughout the lifecycle leaves PG&E exposed to: • **Inability to locate safety critical pipeline information;** • **Poor decision making based upon incomplete information;** • **Poor management of safety critical assets;** • **Failure of its integrity management program;** • **Inaccurate databases, poor data quality and missing pipeline attributes;** • **Failure to comply with legal and business requirements;** • **Inefficient and ineffective information retrieval and time consuming searches;** • **Failure in its duty of care to maintain and retain records throughout their life-cycle; and,** • **Legal and fiscal penalties.**

GARP® Assessment Criteria – Technology – Electronic Document Storage							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1	1	1	1	1	1	1.5	1.5

6.6.4. Geographic Information Systems Deficiencies

Gas Map is the name given to PG&E's geographic information system used to hold 'gas assets on a map'. The initial implementation of this system (Gas Map 1.0) was based upon a relatively simple data model that was populated with spatial information from the Bentley Microstation™ drawing package and merged with pipeline information contained in a myriad of Microsoft Excel spreadsheets. At the time of this review it currently holds details of 40,271 segments of pipe.

The data model used by Gas Map has been significantly revised in more recent versions, as a number of key data attributes had been omitted. The Gas Map system has evolved from version 1.0 to 2.0, however we were informed during our site visit that version 2.0 does not have any dynamic relationship with other databases (e.g. the SAP asset registry). As such, referential integrity, i.e. the ability to look-up data from other more quality controlled systems within the company, across multiple PG&E records-related data bases is not yet possible. Version 3.0 is planned, for release later in 2012/2013 and is likely to have the ability to address this issue, once the quality of the existing datasets has been improved.

The basic concepts of data quality and potential sources of error are not well understood by PG&E employees. For example, there is a misguided perception in some of the teams during our field visits that all data provided within the GIS had been quality assured and was of high quality. This position has now changed as PG&E has recognized that its GIS inaccurately classified significant portions of its gas transmission pipeline systems. In particular, PG&E notes that its own Class Location Study Report "identified approximately 172 miles, or 3% of transmission lines as being in a higher class location than recorded in PG&E's Geographical Information System (GIS). PG&E's same report "identified approximately 378 miles, or 6.5% (of transmission lines) as being lower in class than recorded in GIS."[170] In supplement to its own report, PG&E went on to acknowledge that "About 60% of the differences (in class location designation) reflect erroneous class location designations in GIS".[171] In addition, PG&E hired a third party to study why segments within its gas transmission pipeline system had erroneous class location designations.[172] According to PG&E, this study identified 10 reasons why 1,376 pipeline segments have changed upward in classification. Of those 10 reasons, five explicitly identify the class location change due to an error in the GIS.[173] All told, those five reasons make up 794 pipeline segments that had a classification change upward, which is 57.7% of the total 1,376 transmission pipeline segments.[174]

As part of its Pipeline Safety Enhancement Plan, PG&E now plans to make significant improvements to its data model and integration capabilities. PG&E plan to implement a new linear event-based GIS data model that leverages information from the existing GIS system and SAP. The new GIS system will allow PG&E to view and analyze pipeline features, characteristics and event history relative to specific reference points along the entire length of gas transmission pipelines. The new GIS system will also house a comprehensive list of job files associated with PG&E's gas transmission system.

[170] I.11-11-009, "Pacific Gas and Electric Company's Response to Order Instituting Investigation", Page 2.

[171] Ibid. at 3.

[172] Ibid. at 9, fn 9. PG&E identifies this as the Willbros' Class Location Determination Process

[173] Ibid at 11-16.

[174] Ibid. at 11.

Table 6-29: Impact Statement: Technology (Geographic Information Systems)

IMPACT – TECHNOLOGY – GEOGRAPHIC INFORMATION SYSTEMS (GIS)							
The creation of a GIS system containing incomplete, inaccurate and poorly quality assured pipeline attributes and other pipeline-related metadata leaves PG&E exposed to: • Poor decision making based upon incomplete information; • Poor management of safety critical assets; • Failure of its integrity management program; • Inaccurate databases, poor data quality and missing pipeline attributes; • Failure to comply with legal and business requirements; and, • Legal and fiscal penalties.							
GARP® Assessment Criteria – Technology – Geographic Information Systems (GIS)							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1	1	1	1	1	1	1.5	1.5

6.6.5. Job Tracking System Deficiencies

6.6.6. PSRS

PG&E's Project Status Reporting System (PSRS) is a project management and project tracking tool but holds high level project related metadata, notes, costs, dates of critical activities, design and as-built drawings. This system holds information on approximately 22,000 capital projects and maintenance works. It is used to track final approval is, and provides controls for mapping and drafting activities. However, it does not include information to standing orders (and as such its records are not complete). The PSRS was designed to emulate the job file electronically but is not regarded as a master repository for the 'document of record'. The hard copy drawings are still regarded as the definitive masters within PG&E.

6.6.7. ECTS

PG&E's Enterprise Compliance Tracking System was developed post San Bruno, to provide compliance and regulatory support during the subsequent investigation, and has also been used to support the MAOP Records Validation Project. While the ECTS system already hosts over 2 million pages of scanned documents, this system is not a long-term document management solution. This system now holds details of each line number and segment. However, it is regarded by PG&E as an interim holding area only, and not the final repository for this information. While extensive work is being undertaken to classify the contents of the job folders, and identify critical records (as defined on the Pipeline Features List (PFL)) a significant proportion of all of the documents scanned as part of the MAOP Records Validation Project have been classified as miscellaneous.

Table 6-30: Impact Statement: Technology (Job Tracking Systems)

IMPACT – TECHNOLOGY – JOB TRACKING SYSTEMS
The lack of an integrated job tracking and document control system for all pipeline-related projects within the Gas Transmission business leaves PG&E exposed to: • **Inability to locate safety critical pipeline information;** • **Poor decision making based upon incomplete information;** • **Poor management of safety critical assets;** • **Failure of its integrity management program;** • **Inaccurate databases, poor data quality and missing pipeline attributes;** • **Failure to comply with legal and business requirements;** • **Inefficient and ineffective information retrieval and time consuming searches;** • **Failure in its duty of care to maintain and retain records throughout their life-cycle; and,** • **Legal and fiscal penalties.**

GARP® Assessment Criteria – Technology – Job Tracking Systems							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1	1	1	1	1	1	1.0	1.0

6.6.8. Gas Leak Tracking and the IGIS System Deficiencies

PG&E has failed to maintain a definitive, complete and readily accessible database of all gas leaks for their pipeline system as it has failed to routinely migrate all historical leak information from management system to management system. The current IGIS leaks database is incomplete and only contains a comprehensive record of all historical leak information from 1999, despite the obligation placed upon PG&E to maintain a complete record of all gas leaks over the life of the asset, see ASME standard comparison in appendix 9.

PG&E's integrated gas information system (IGIS) was developed in 1999 to track and monitor gas leaks and their related information. One of the primary inputs to the system is the A-Form (a record in its own right) which is used in the field and in the office to capture a wide range of information/attributes about the leak. At the time of site visit, October 2011, we were informed and observed that the IGIS system held information on 27,771 leaks, ranked from grades 1-3 in order of severity (with Grade 1 leaks requiring immediate action).

We were informed during our discussions that the IGIS database was not complete or comprehensive: Prior to 1999, gas leak information was maintained in an earlier PC-based database called PC Leaks, which in itself replaced a prior mainframe system and an even earlier hardcopy based leak listing. PG&E were clear that only open leak details were transferred to IGIS in 1999 (i.e. those leaks that had not yet been addressed at the time of the data migration from PC Leaks to IGIS). Historical leak information has not been transferred to IGIS. Only the last 11 to 12 years of gas leak records are readily available within IGIS. It is not possible to analyze the historical leak data over the full lifetime of any given pipeline (which can be 60+

years or more). Nor is it possible to review the correlation between the leak data and other pipeline related information (such as age of pipe, location, construction, type of weld etc.) to assess what if any underlying problems exist, and their likely cause.

PG&E has stated that it should be possible to retrieve the historical leak information from a backup copy of the PC Leaks database, the mainframe data from backup tapes, and the leak listings from its hardcopy records. However, this assertion has yet to be tested. What is clear is that the gas leak information that exists is not complete, and that the information required to complete the gap is not readily accessible. Any data retrieval from historical back-up tapes or other magnetic media is likely to be both time consuming and problematic, given the technological obsolescence issues that may arise. Specifically, PG&E must locate a tape drive capable of reading the magnetic tape backup, and it also must have a comparable IT system for the backup to be restored to. PG&E also must have copies of the necessary applications used at the time to create the mainframe listing in the first instance, in order to access the data in a readable format.

The absence or incompleteness of critical leak information contributes to diminished PG&E pipeline safety. In addition, the accuracy of leak information that is recorded has been placed at issue by CPSD discovery of PG&E, and by PG&E itself.

6.6.9. Scanning

Scanning, if undertaken properly, and for the right reasons, can make information more accessible, and reduce the amount of physical space taken up by paper records. However, it can also have serious cost and legal implications. It is important when scanning to follow appropriate policies and procedures in place to ensure that any scanning carried out can be relied upon as a true copy of the original. This is particularly so when legal discovery processes may be invoked. Prior to 2010, scanning had not been undertaken on a systematic basis within the Gas Transmission Division. However, as of December 30, 2011, approximately 2,597,000 single page images had been scanned into ECTS for the MAOP project.[175]

[175] The actual number of multi-page documents scanned cannot be estimated.

Table 6-31: Impact Statement: Technology (Gas Leak Records)

IMPACT – TECHNOLOGY – GAS LEAK RECORDS and IGIS SYSTEM DEFICIENCIES[176]
The lack of a complete and comprehensive inventory of all recorded gas leaks over the lifetime of any given pipeline leaves PG&E exposed to: • **Incomplete sets of safety critical information;** • **Technological obsolescence of its digital archives;** • **Loss of knowledge of historical gas leak problems and patterns (pre-1999);** • **Inability to locate safety critical pipeline information;** • **Poor decision making and risk assessments based upon incomplete information;** • **Poor management of safety critical assets;** • **Failure of its integrity management program;** • **Inaccurate databases, poor data quality and missing pipeline attributes;** • **Failure to comply with legal and business requirements;** • **Inefficient and ineffective information retrieval and time consuming searches;** • **Failure in its duty of care to maintain and retain records throughout their life-cycle; and,** • **Legal and fiscal penalties.**

GARP® Assessment Criteria – Technology – Gas Leak Records							
Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
1	1	1	1	1	1	1	1

[176] The National Transportation Safety Board Stated, "Until May 6, 2011, the PG&E GIS had listed the cause of the leak as "unknown." However, as a result of records discovered during a PG&E post accident records search, information was added to indicate that 12 feet of Line 132 had been replaced "due to a longitudinal defect." A leak survey inspection and repair report dated October 27, 1988, classified the cause of the leak as a "material failure" and indicated that a material failure report was prepared, but PG&E could not locate any such report. Records showed that the replacement work had started on November 1 and been completed on November 4, 1988. No further information was available regarding the cause of the leak. Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire San Bruno, California September 9, 2010, P. 38. These problems are examples of incomplete sets of safety critical information due to lack of a complete and comprehensive inventory of all recorded gas leaks over the lifetime of any given pipeline, as identified in the impact statement above.

6.7. Poor records management gas increased the risk of earthquake damage to PG&E's gas transmission pipelines

In order to demonstrate the importance of good records management, particularly in California, we have included a short section that links earthquakes, pipelines and records management.

6.7.1. Lack of accurate gas transmission line records has left PG&E uncertain that each of its pipelines built before 1950 would withstand some earthquakes

The 1992 Federal Emergency Management Agency (FEMA) report on the earthquake resistant construction of gas and liquid fuel pipeline systems concluded that:

> "the overall performance record of gas and liquid fuel pipeline systems in past earthquakes was relatively good. However, catastrophic failures did occur in many earthquakes, particularly in areas of unstable soils. Modern, welded steel pipelines, with adequate corrosion protection, have a good performance record. Older pipelines, including welded pipelines built before 1950 in accordance with quality control standards less stringent than those used currently, as well as segmented case iron pipelines, have been severely damaged."[177]

This conclusion elevates the importance of having accurate, complete and accessible records for welded pipelines built before 1950, which happens to include line 132. While part of PG&E line 132, segment 180 was relocated in 1956, this pipeline is listed as being built in 1948. Even for PG&E's recently built gas transmission pipelines, PG&E's lack of complete, accurate, accessible and up-to-date weld and corrosion records is problematic.

6.7.2. Lack of accurate gas transmission line records has left PG&E unable to precisely identify which pipelines are prone to extensive damage during some earthquakes

In California, pipeline records showing accurate dates and characteristics, such as yield strengths and types of welds, were essential in identifying the kind of gas transmission line that suffered extensive damage during the 1971 San Fernando earthquake.

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[177] Yokel, F.Y. and Mathey, R.G. (1992) Earthquake Resistant Construction of Gas and Liquid Fuel Pipeline Systems Serving, or Regulated by, the Federal Government. Federal Emergency Management Agency, FEMA- 233, July 1992.

As the FEMA study[178] states:

> "Extensive damage occurred to underground welded-steel transmission pipelines during the 1971 San Fernando earthquake. The most serious damage occurred to anoxy-acetylene-welded pipeline installed about 1930. In the same general area of the San Fernando Valley that experienced extensive ground failures, several newer pipelines installed after 1960 did not experience failure. Before the early 1930s, steel pipelines in California were often constructed under quality control less stringent than that imposed today. The newer pipelines were characterized by higher yield strengths (x-grade) and modern arc welding"[179]

Accurate, comprehensive and quickly accessible records are also essential in order for PG&E to identify similar kinds of pipelines to the one that was damaged during the 1971 San Fernando earthquake.

[178] Ibid.

[179] Ibid.

7. Records Management Assessment

This section consolidates the review findings and analysis presented in section 6 pertaining to PG&E records management activities and information maturity prior to the San Bruno pipeline rupture and fire.

7.1. Introduction

We find that PG&E's record management activities in the Gas Transmission Division prior to the San Bruno pipeline rupture and fire to have been '**Sub-Standard**'[180] (Mean Maturity Score = 1.2). While some elements of PG&E's records management activities, such as the creation of records retention policies rate slightly higher '**In-Development**' rating (Maturity Score = 2.5), no elements were sufficiently developed to meet the '**Essential**' minimum requirements (Maturity Score = 3) necessary to meet PG&E's legal and regulatory requirements. The definition of each of the Information Maturity levels is explained below:

> **Level 1 (Sub-standard):** This level describes an environment where record-keeping concerns are either not addressed at all, or are addressed in a very ad hoc manner. Organizations that identify primarily with these descriptions should be concerned that their programs will not meet legal or regulatory scrutiny.
>
> **Level 2 (In Development):** This level describes an environment where there is a developing recognition that record-keeping has an impact on the organization, and that the organization may benefit from a more defined information governance program. However, in Level 2, the organization is still vulnerable to legal or regulatory scrutiny since practices are ill-defined and still largely ad hoc in nature.
>
> **Level 3 (Essential):** This level describes the essential or minimum requirements that must be addressed in order to meet the organization's legal and regulatory requirements. Level 3 is characterized by defined policies and procedures, and more specific decisions taken to improve record-keeping. However, organizations that identify primarily with Level 3 descriptions may still be missing significant opportunities for streamlining business and controlling costs.[181]

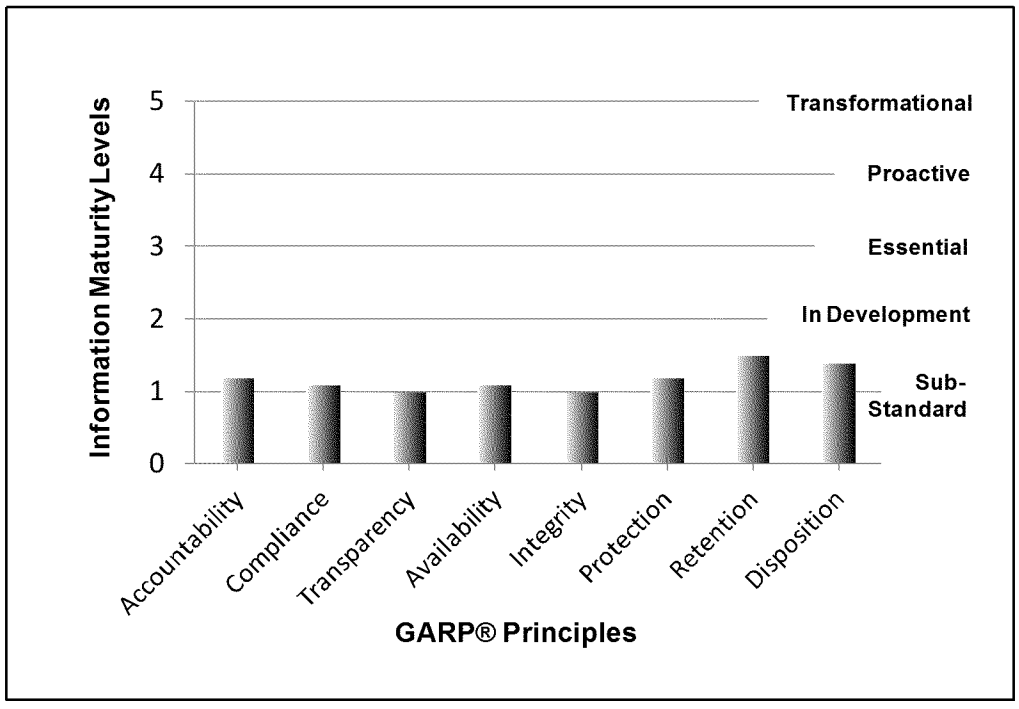
[180] We have used the Generally Accepted Record-keeping Principles (GARP®) and the ARMA International Information Maturity Model to arrive at this conclusion. See http://www.arma.org/garp/metrics.cfm

[181] http://www.arma.org/garp/metrics.cfm

Table 7-1: PG&E Gas Transmission Division's Information Maturity prior to the San Bruno Pipeline rupture and fire, based upon GARP® Principles

GARP® Assessment Criteria Records Management Theme	Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
Strategy	1.5	1.5	-	-	-	-	-	-
Responsibilities	1.5	1.5	1	1	1	1	1	1
Training	-	1	-	1	-	1	1	1
Policies, Standards, Procedures	1	-	-	2	-	-	-	-
Records Retention	1.5	1	1	1	1	1	2.5	2
Business Continuity & Vital Records	-	1	-	-	1	2.5	-	-
Records Management Processes	1	1	1	1	1	1	1.5	1.5
Records Management Storage	1	1	1	1	1	1	1.5	1.5
Technology	1	1	1	1	1	1	1.5	1.5
Average Maturity Score (1-5)	1.2	1.1	1.0	1.1	1.0	1.2	1.5	1.4

Figure 7-1: PG&E's position on the GARP® Information Maturity Model



7.2. Generally Accepted Record-keeping Principles ® (GARP ®)

In this section, our findings are summarized in terms of both the review themes and GARP®[182] principles used to assess them.

7.2.1. Principle of Accountability[183]

"An organization assigns a senior executive who will oversee a record-keeping program and delegate program responsibility to appropriate individuals. The organization adopts policies and procedures to guide personnel, and ensure the program can be audited."

The following summarizes why PG&E received an overall accountability score of 1.2, as shown in Table 7-1 and Figure 7-1:

PG&E as a company did not have:

- A strategy to deliver a company-wide record-keeping program;
- A senior executive actively involved in monitoring records management across all PG&E departments, divisions, offices;
- Clear lines of delegation for either managing the company-wide systems for record-keeping, or for supervising the people who completed the record-keeping activities;
- Record-keeping procedures or guidance on the implementation of the record retention standard practices for the Divisions;
- Records management goals in relation to accountability for compliance with the retention schedules.

PG&E's Gas Transmission Division also had the following specific problems:

- Not everyone was aware of the PG&E policies and standard practices documents relating to records retention;
- Little evidence was observed to demonstrate the existence of a standardized records management program across the division, or of an on-going program of monitoring for compliance or corrective actions;
- The records manager's role was largely non-existent, and regarded as an administrative/clerical role distributed among general staff and supervisors.

[182] www.arma.org/garp

[183] http://www.arma.org/garp/metrics-accountability.cfm

7.2.2. Principle of Transparency[184]

"The processes and activities of an organization's record-keeping program are documented in a manner that is open and verifiable and is available to all personnel and appropriate interested parties."

The following summarizes why PG&E received an overall transparency score of 1.0, as shown in Table 7-1 and Figure 7-1:

Within PG&E:

- Elements of PG&E record-keeping practices were embedded within corporate standard practices, and not delivered clearly at the operational level.

Within the PG&E Gas Transmission Division:

- Not all staff were aware of the corporate standard practices' documents;
- There was no standard process for the management of the Gas Transmission Division's pipeline records or their related job-files;
- The company did not provide clear, complete, consistent and documented processes and activities in relation to their record-keeping;
- No verification of the Gas Transmission Division's record-keeping processes was undertaken and documented.

7.2.3. Principle of Integrity[185]

"A record-keeping program shall be constructed so the records and information generated or managed by or for the organization have a reasonable and suitable guarantee of authenticity and reliability."

The following summarizes why PG&E received an overall integrity score of 1.0, as shown in Table 7-1 and Figure 7-1:

Within PG&E:

- Their record-keeping systems did not accurately and completely record the activities of the organization and as PG&E's records cannot be guaranteed as reliable.

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[184] http://www.arma.org/garp/metrics-transparency.cfm

[185] http://www.arma.org/garp/metrics-integrity.cfm

Within the PG&E Gas Transmission Division:

- There are no defined processes to provide an audit trail of the authenticity of the Gas Transmission Division's records, and as such it is difficult for PG&E to demonstrate that it conducted all of its activities in a lawful and appropriate manner.

The **integrity** of a record is directly related to the ability to prove that a record is authentic and unaltered. PG&E's senior officers are ultimately responsible for business records, as they are strategic and operational assets. Over PG&E's history, the management of its job files' records has not been efficient or effective, and the index of the job files was neither complete nor accurate. The approach to capturing descriptive information (metadata) including storage locations about the records has varied considerably over time, and was poorly implemented.

7.2.4. Principle of Protection[186]

"A record-keeping program shall be constructed to ensure a reasonable level of protection to records and information that are private, confidential, privileged, secret, or essential to business continuity."

The following summarizes why PG&E received an overall protection score of 1.2, as shown in Table 7-1 and Figure 7-1:

Within PG&E:

- The systems, processes and tools (e.g. Documentum) existed to provide an auditable system of electronic records management capable of providing some level of protection and access controls, but were not used within the Gas Transmission Division.
- The level of protection provided to the records varied from office to office with access controls to records implemented by individual record owners;

Within the PG&E Gas Transmission Division:

- The decentralized nature of Gas Transmission Division's job file storage and the lack of records tracking and control made protection and access to hard copy records impossible to manage;
- Records for business continuity purposes were identified but with no corporate policy on access it is unlikely that PG&E's hardcopy vital records were well protected;

[186] http://www.arma.org/garp/metrics-protection.cfm

- The corporate standard electronic document management system (Documentum) had not been introduced, despite its success in PG&E's Nuclear Division.

7.2.5. Principle of Compliance[187]

"The record-keeping program shall be constructed to comply with applicable laws and other binding authorities, as well as the organization's policies."

The following summarizes why PG&E received an overall compliance score of 1.1, as shown in Table 7-1 and Figure 7-1:

Within PG&E the company did not have:

- A central view of its record-keeping practices;
- Complete and accurate metadata associated with the job files;
- A complete and comprehensive set of project files;
- A fully implemented and audited records retention process;

Therefore PG&E lacked a consistently defensible position.

Within the Gas Transmission Division:

- Staff defined their own compliance practices based on their awareness and interpretation of various laws and regulations.

7.2.6. Principle of Availability[188]

"An organization shall maintain records in a manner that ensures timely, efficient, and accurate retrieval of needed information."

The following summarizes why PG&E received an overall availability score of 1.1, as shown in Table 7-1 and Figure 7-1:

Within PG&E there was:

- No company-wide electronic document management system;

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[187] http://www.arma.org/garp/metrics-compliance.cfm

[188] http://www.arma.org/garp/metrics-availability.cfm

- No definitive records management cataloguing system;

With the Gas Transmission Division:

- It was unclear where to go to find up-to-date and accurate information on line 132;
- There was a lack of knowledge as to who to go to, to find records;
- There was a lack of a single, complete and accurate index of folders with appropriate metadata and consistent numbering conventions to aid searching;
- A number of the records required, had been retained by employees either in local offices, or in their homes after they had left the organization;
- Storage conditions of physical documents varied greatly from office to office with documents housed in "boxes, file cabinets, desktops, inboxes, off-site locations, adjacent buildings, and external storage sheds/containers[189].

As physical storage across all 46 offices/record stores was not well-managed it would have been difficult for PG&E to minimize inconsistent and erroneous interpretation of the facts, simplify legal processes and regulatory investigations, or protect valuable information from being lost, corrupted, or stolen. Pipeline-related records were not readily available when needed. Given the distributed manner in which they were stored, it would have taken a significant time and effort to locate the records and establish a master set of all job file related records with the complete, accurate and correct versions.

7.2.7. Principle of Retention[190]

"An organization shall maintain its records and information for an appropriate time, taking into account legal, regulatory, fiscal, operational, and historical requirements."

The following summarizes why PG&E received an overall retention score of 1.5, as shown in Table 7-1 and Figure 7-1:

Within PG&E the company had:

- Corporate standard practices for record retention and destruction that included schedules identifying the laws, regulations and CPUC resolutions that related to record-keeping;
- No structure for auditing or monitoring the implementation of these standard practices.

[189] GasTransmissionSystemRecordsOII_DR_CPUC_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

[190] http://www.arma.org/garp/metrics-retention.cfm

Within the PG&E Gas Transmission Division:

- Staff retained records in several locations based on their own or local business needs;
- The lack of central control over pipeline-related records and a decentralized approach to their storage meant that any attempt at applying PG&E records retention periods from the schedule would be very difficult and most likely was not undertaken on a regular basis with appropriate monitoring;
- Education and training about the retention schedules, their importance, and the necessity to comply with them, was not provided to staff;
- Some employees were not aware of how long to keep specific records, where to find this information, or even if a records retention schedule exists;
- Most employees were unaware of the specific record retention guidelines as defined by GOV-7001S.[191]

We believe that the rules and regulations that should define retention were not systematically applied in the Gas Transmission Division. The implementation of the corporate records retention guidelines was haphazard at best. In the absence of retention schedules, employees either kept everything or disposed of records based on their own local office practices and business needs, rather than those of the organization. While a retention schedule was available, it did not encompass all record types present within the gas transmission business and was not well known around the division.

7.2.8. Principle of Disposition[192]

"An organization shall provide secure and appropriate disposition for records that are no longer required to be maintained by applicable laws and the organization's policies."

The following summarizes why PG&E received an overall disposition score of 1.4, as shown in Table 7-1 and Figure 7-1:

Within PG&E:

- The process for suspending disposition in the event of investigation was not apparent;
- There is a realization of the importance of suspending disposition in a consistent manner, repeatable by certain legal groupings, but little enforcement or auditing of disposition.

[191] GasTransmissionSystemRecordsOII_DR_CPUC_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

[192] http://www.arma.org/garp/metrics-disposition.cfm

Within PG&E's Gas Transmission Division:

- While there was a process for the Records Center in the Standard Practice there was little evidence of any proactive work to identify records eligible for disposition;
- Not all document destruction has occurred in accordance with PG&E records retention schedules, and, in some cases (cf. the disposal of the historical pipeline files) was in direct contravention of existing policies;
- Record retention and disposal processes were not aligned with GOV-7001S;
- While there is no formal appraisal process for disposing of records, mapping staff still spend time removing and disposing of "unnecessary information" from their job folders;
- Education related to retention and disposal was not consistent, or well communicated, and varies from office to office.

Disposal of records should be performed in a secure and environmentally friendly manner, ensuring that records to be destroyed are transported securely and destroyed completely. Given the lack of control over PG&E's records, it would have been difficult for PG&E to demonstrate that it had made a reasonable effort to ensure that all versions and copies of the records were included in any disposition exercise. If the disposal actions on the historical pipeline records had been formally appraised prior to their destruction, the historical or intrinsic value of these records should have been recognized, and they may not have been disposed of.

7.3. Impact

Tables 7.2, 7.3 and 7.4 in the following section each respectively identifies PG&E's exposure to a range of risks associated with the records management themes reviewed in each section of our report. Each table summarizes the specific issues and impacts identified in this report and uses the GARP® assessment criteria to link PG&E's information maturity and records management to risk.

Table 7-2: Impact Summary: Strategy

THEMES	IMPACT
STRATEGY	Lack of a strategy to assign a senior officer to develop and deliver a records management program with policy, auditable process and guidance that support the objectives of the company, leaves PG&E exposed to: • Lack of corporate governance and a failure to comply with legal and business requirements; • Actual working practices failing to implement corporate policies; • Unaudited, subjective processes and procedures for managing records; • Staff untrained in records management principles and corporate governance requirements; and, • Penalties and / or costs.
Strategy - RESPONSIBILITIES	Lack of consistent and clear instruction to senior officers to ensure that they understand and deliver their actions within the records retention standard practices. This leaves PG&E exposed to: • Incomplete and inconsistent process for disposition of records; • Inconsistent and un-followed methods for indexing, accessing, filing and storing records; • Time wasted re-inventing record-keeping processes; • Increased likelihood of more than one incomplete set of records being retained in different locations; • Inability to monitor compliance with the corporate standard practices and policies; and, • No knowledge as to who is responsible for record-keeping practices within the Division to comply with the PG&E company-wide Records Retention Standard Practices' requirements.
Strategy – TRAINING	Lack of any RM training, mentoring or support for staff with record-keeping responsibilities as well as all other staff leaves PG&E exposed to: • Legal and Fiscal Penalties when staff dispose of records that are required to be retained; • Staff with no knowledge of RM Program and compliance requirements of the standard practices; • Vital Records being removed from office to home without controls; • Pockets of un-indexed legacy filing when staff leave; and, • Time wasting when staff don't know where and how to retrieve up-to date information.

GARP® Assessment Criteria	Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
Strategy	1.5	1.5	-	-	-	-	-	-
Responsibilities	1.5	1.5	1	1	1	1	1	1
Training	-	1	-	1	-	1	1	1

Table 7-3: Impact Summary: Policies, Standards and Procedures

THEMES	IMPACT
POLICIES, STANDARDS, PROCEDURES	Inconsistent adoption of the Dewey classification scheme that proved difficult to apply at the gas transmission level may have assisted in the: • Untimely disposal of records; • Lack of consistent indexing; • Inefficient access and retrieval of records.
Policies, Standards, Procedures – RECORDS RETENTION	PG&E had retention standards from the 1950s to the present day, however it appears they were not well known around the organization and required that Divisions created their own retention schedules. This approach may well result in: • An incomplete set of record types being identified; • Lack of a regular review and update to the schedules; • Out of date laws, regulations, standards and resolutions being applied against the records; • Untimely disposal of records; and / or, keeping personal data longer than regulations require; • Ignorance of the business needs to retain certain records; • Inconsistent methods for managing compliance with the retention standard practices; • Subjective, and / or, incorrect interpretation of laws and regulations resulting in: Ignorance regarding 'legal holds'; Destruction of records that must be retained for the 'life of the facility'; Out of date versions of drawings, specifications and other records being retained as 'masters'; and this could lead to: Unsafe working practices
Policies, Standards, Procedures – BUSINESS CONTINUITY & VITAL RECORDS	PG&E recognized the need for a Vital Records Standard in 1969 as being "separate and distinct from the records retention program" and cited "key operational records" as being in the 'vital' category. It is important that this et of records is identified and included in all RM Program standards and guidance. Lack of understanding the difference between vital records and those required for retention, legal and business needs, may result in PG&E • Identifying & protecting an incomplete set of records for business continuity purposes; • Confusing records that may be duplicated and retained in a secure and separate area with those that are required to be retained unchanged for legal and fiscal reasons; and, • Disposing of records that are dual purpose but where there is only one copy.

GARP® Assessment Criteria	Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
Policies, Standards, Procedures	1	-	-	2	-	-	-	-
Records Retention	1.5	1	1	1	1	1	2.5	2
Business Continuity & Vital Records	-	1	-	-	1	2.5	-	-

Table 7-4: Impact Summary: Records Management Processes, Storage and Technology

THEMES	IMPACT
PROCESSES	PG&E failed to provide a complete, consistent, controlled and readily accessible set of pipeline records covering the lifetime of each pipeline. There was no definitive catalog of their pipeline records and no consistent, quality assured numbering system for the pipeline-related jobs and job folders. This leaves PG&E exposed to: • Inability to locate safety critical pipeline information; • Poor decision making based upon incomplete information leading to costly and potentially fatal mistakes; • Poor management of safety critical assets; • Failure of its integrity management program; • Inaccurate databases, poor data quality and missing pipeline attributes; • Failure to comply with legal and business requirements; • Inefficient and ineffective information retrieval and time consuming searches; • Failure in its duty of care to maintain and retain records throughout their life-cycle; and, • Legal and fiscal penalties.
STORAGE	The decentralized approach to records storage adopted within the Gas Transmission Division; the lack of a central index of the distributed job folders; and, the lack of a central catalog of all pipeline-related records also leave PG&E exposed to an identical set of issues as the records management processes cited above.
TECHNOLOGY	The lack of: a comprehensive inventory of all recorded gas leaks; an integrated job tracking and document control system for all pipeline-related projects; quality assured pipeline attributes and other pipeline-related metadata; and a single, searchable, readily accessible and fully populated electronic document and records management system (EDRMS) leaves PG&E exposed to the same issues as the records management processes cited above, as well as : • Incomplete sets of safety critical information; • Technological obsolescence of its digital archives; • Loss of knowledge of historical gas leak problems and patterns (pre-1999); • Inability to locate safety critical pipeline information; • Poor decision making and risk assessments based upon incomplete information.

GARP® Assessment Criteria	Accountability	Compliance	Transparency	Availability	Integrity	Protection	Retention	Disposition
Processes	1	1	1	1	1	1	1.5	1.5
Storage	1	1	1	1	1	1	1.5	1.5
Technology	1	1	1	1	1	1	1.5	1.5

7.4. Conclusions

Within PG&E's Gas Transmission Division the records management practices were unsound and led to inefficient and unsafe working practices. PG&E's failure to ensure that complete and accurate information was available at the right time contributed towards creating a safety risk to the general public. While the San Bruno pipeline rupture and fire cannot be attributed simply to inadequate records management practices, PG&E's failure to manage the Gas Transmission Division's information in a systematic and controlled manner was a contributing factor.

Given the safety critical nature of PG&E's business, and the 100 year plus life expectancy of its pipeline infrastructure, PG&E should have had in place a records management strategy that put greater emphasis upon managing its pipeline-records, completely and accurately, for the "life of the asset"; and focused on long term access, storage, retention, preservation and protection of its physical and digital records. While PG&E has a duty to service its operations and maintain records that may be required for evidential purposes, it did not have a strategy in place to ensure that their standard practices relating to record-keeping were being implemented.

At the time of the San Bruno pipeline rupture and fire PG&E's Gas Transmission Division did not have:

- A strategy for record management;
- Records management practices and processes that were verifiable, documented and available to all;
- Complete and accurate records of the organization;
- A level of protection that had appropriate access controls;
- A record-keeping program that could comply with applicable laws and business requirements;
- The ability to accurately and efficiently retrieve their records in a timely manner;
- Education and training in records management practices available and compulsory for all staff ;
- A secure and monitored disposal process with appropriate facility for 'legal holds'.

PG&E had been slow to recognize the value of its information as a corporate asset, and as such did not have the management systems in place commensurate with its value. The development of company policies and standards for records and information management had not been viewed as a priority, nor had the need to manage records systematically and consistently across the Division. Records management was not sponsored at a senior level and as such many staff did not have a clear idea of their roles and responsibilities in this area. The lack of communication, education and training, simply compounded this issue.

While a significant amount of work has been undertaken to develop the company's GIS systems, a focus of attention in this area has diverted attention away from some of the more fundamental and long-term records management and data quality issues facing the business.

A number of different electronic indexes/manual ledgers and map-based access routes were used to access different sets of documentation. As such, it was extremely difficult for anyone to undertake any form of comprehensive search for pipeline records without the assistance of the Engineering Library Staff in Walnut Creek. Even then, the results were not definitive as the catalogs at their disposal were neither complete nor comprehensive. In addition, the duplication, geographic spread and evolutionary nature of the pipeline job folders meant that the records staff could not have provided any assurance that their searches located ALL pertinent information, unless they retrieved all of the related job folders from their respective storage locations/offices across the Gas Transmission Division. The diversity of different systems, catalogs, and storage locations meant that it was difficult for staff to gain a full picture of the information available to them on a given pipeline, let alone understand what was missing.

The bulk of the Gas Transmission Divisions Records Management activities prior to San Bruno focused upon addressing the operational needs of active projects. Little attempt had been made to address the PG&E's 'paper-mountain' of historical records or develop of a comprehensive inventory and control process for all of the Gas Transmission Divisions historical records. This has left a legacy of records management issues in its wake, which are only now, post San Bruno, starting to be addressed.

Many different industries have to operate in safety critical environments. The companies that operate in these sectors have all faced similar records management challenges to that of PG&E and have had to create the necessary programs, policies, procedures, systems and training to cope with such demands. Those that have been most successful have recognized the importance of their records and managed them as they would any other company asset. There a numerous success stories out there that demonstrate that it is possible to get records management right.

This report, and its findings and conclusions, are consistent with the findings and conclusions of the NTSB, the Blue Ribbon Panel, and PG&E itself. Each may have reached its findings and conclusions based on different considerations and perspectives. However, each has concluded that PG&E's recordkeeping practices have been deficient and have diminished pipeline safety. NTSB, the agency charged with ascertaining the cause of the September 9, 2010 pipeline rupture, has discussed PG&E recordkeeping deficiencies in its reports on the incident and its urgent safety recommendations also flowing from the incident. On January 3, 2011 the NTSB issued an "urgent safety recommendation" that noted:

> "The NTSB's examination of the ruptured pipe segment and review of PG&E's records revealed that although the as-built drawings and alignment sheets mark the pipe as seamless API 51 Grade X42 pipe, the pipeline in the area of the rupture was constructed with longitudinal seam-welded pipe……Consequently,

> the short pieces of pipe of unknown specifications in the ruptured pipe segment may not be as strong as the seamless API 51, Grade X42 steel pipe listed in PG&E's records…..It is critical to know all the characteristics of a pipeline in order to establish a valid MAOP below which the pipeline can be safely operated. The NTSB is concerned that these inaccurate records may lead to incorrect MAOPs."

The same urgent safety recommendation urged PG&E to search "aggressively and diligently" for all "as-built drawings, alignment sheets, and specifications, and all design, construction, inspection, testing maintenance, and other related records…." in class 1 and 2 locations that had not had MAOP validated through hydro testing. The NTSB added that the "records should be traceable, verifiable, and complete".[193] PG&E was unable to comply with the recommendation and order, causing the Commission to issue its order to show cause. PG&E's inability to comply to gather and analyze data, in response to an urgent NTSB recommendation and Commission order, is a damning testament to the state of PG&E's recordkeeping. In its September 2011 final report on the San Bruno pipe rupture, the NTSB concluded that "PG&E lacks robust data and document information management systems and processes. These hinder the collection, quality assurance/quality control, and analysis of data to fully characterize threats to pipelines as well as assess the risk posed by the threats on the likelihood of a pipeline's failure". After the San Bruno rupture, the Commission contracted various experts for an analysis and report on the reasons why it occurred. In June 2011 a panel of consultants, named the "Blue Ribbon" panel, released their report. The panel implicated recordkeeping deficiencies as one of the factors that led to the rupture.

Despite PG&E admitting to this Commission that its pipeline recordkeeping was deficient, it has asked this Commission for authority to spend $222.8 million to reform its recordkeeping, and charge these costs back to its ratepayers. As consultants, we suggest that these costs are excessive, and we cannot support PG&E's request for them regardless of their total. The scope and degree of PG&E's proposals do, however, inform the Commission of the nature of the recordkeeping transformation and improvement that PG&E must undertake. We also suggest that the Commission take note of the final version of PG&E's Internal Report pertaining to recordkeeping in the Gas Transmission Division that is being developed on its behalf by Pricewaterhouse Coopers, and is due for released in early March. As we have stated earlier, the draft of this report provided a damming indictment of the state of PG&E's current record keeping practices many of which have not changed since the San Bruno Pipeline rupture and fire. Finally, we recommend that the commission consider implementing an annual records management audit of PG&E to monitor its ongoing records management activities, performance and improvement.

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[193] National Transportation Safety Board. 2011. Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire, San Bruno, California, September 9, 2010. Pipeline Accident Report NTSB/PAR-11/01. Washington, DC, p.133

8. Appendices

8.1. Appendix 1: An Introduction to Records Management

8.1.1. A short history of Records Management

As this investigation covers an extended period of time, from 1955 to date, and references records management practices from the early 1900s, it is worthwhile placing records management in its historical context. Our reason for discussing these matters is to show that from the 1930s large corporations such as PG&E should have been accustomed to record keeping requirements and compliance with standards.

It is worth noting that on October 23 1912 the Railroad Commission of the State of California established and issued the Uniform Classification of Accounts for Gas Corporations that was adopted in January 1913. While it was primarily a system for managing financial information it did include references to keeping engineering and other records and memoranda. Since October 10, 1912, the CPUC's General Order 28, required every public utility and common carrier under CPUC jurisdiction to "preserve all records, memoranda and papers supporting each and every entry (for) (a)ll records pertaining to depreciation and replacement of equipment and plant."

The 1930s and 40s: It was in the 1930s that record keeping practices became more widely recognized.[194] The National Archives and Records Administration (NARA) was established as the result of legislation passed by Franklin D Roosevelt, in 1934 and "is the nation's record keeper".[195] NARA's remit was to identify, from the volume of records being created by the US government, federal records that should be retained. By the late 1930s the National Archive had recognized that duplication, lack of procedures and inconsistency in managing records was rife amongst the various different government agencies. In 1943 the Records Disposal Act was passed and then amended in 1945. The amendment provided a general schedule identifying and authorizing the disposal of certain records common amongst government agencies. In 1948 the National Records Management Council of New York was awarded a contract to make recommendations to improve government efficiency in managing records. This initiative came from the first Hoover Commission that had recommended organizational changes to promote economy, efficiency, and improved service.

[194] P2-191- (Chapter 2 and 2A Attachments) PG&E Circular Letter Ex642: Federal Power Regulations to Govern the Preservation of Records (05/17/1951) refers to a letter from a Mr. Downing, dated 8 December 1938, relating to the Federal Power Commission's Regulation to govern the preservation of records of public utilities and licensees, effective August 1938,

[195] www.nara.gov

The U.S. National Archives and Records Administration (NARA) has recognized Records Management from its beginnings in the 1930's to modern day. Under NARA Regulations Sub Chapter B of 36 CFR Chapter XII parts 1220 to 1239 it provides detailed records management guidance to government agencies. It references ISO 15489 throughout parts 1220 to 1239 as the standard used as guidelines for Subchapter B. Subchapter B contains the regulations affecting Federal agencies and their records management programs. The most recent revision to these regulations was effective 2 November 2009. NARA provides a 'crosswalk' from the previous regulations to the current. NARA regulations are relevant to the San Bruno investigation because they have provided background and context to recognized record keeping standards since the 1930s. The fact that NARA provides records management guidance to government agencies, impacts on record keeping statements within laws and regulations, as well as the record keeping practices within all sectors of the U.S. economy, including gas transmission.

The 1950s and 60s: The Water Power Commission (1920) became the Federal Power Commission in 1930 when Federal Regulation began in earnest and by the 1950s the FPC's Regulation to govern the preservation of records of public utilities and licensees (1938) had been in effect for 12 years. However, Records Management as a profession with a set of principles and standards, was still in its infancy in the 1950s but organizations with a clear remit to preserve records were already developing policies and practices to manage their records. The Federal Records Act of 1950 established the framework for records management programs in Government Agencies. In the energy and engineering sectors in the 1950s drawings, specifications, welders documentation were hand-written and produced on paper; managed and maintained by the engineers and technicians and if they were typed, perhaps then 'filed' by the secretary in the local offices. Rarely, if at all, were 'active' records maintained centrally, the person who created and used the documents kept the documents. Duplication was not a simple matter unless the document was typed with a carbon copy so little was removed and protected in a central location. During the 1950s the commercial records management industry was born with a number of removal companies developing specialized storage services for records. They provided warehousing, transport and cartons to pack and store documents that organizations had to retain for numbers of years. Similarly, PG&E, in 1961[196], introduced the Records Center to the General Office Departments to provide storage for corporate records that were required to be retained. . In 1955, the American Records Association (ARMA)[197] was founded. It later merged with The Association of Records Executives and Administrators (AREA) to become the Association of Records Managers and Administrators retaining the acronym ARMA and becoming the national professional body for records and information managers. Today, with more than 10,000 members across the globe, the association provides education, standards, guidelines and publications including the "Generally Accepted Record-Keeping Principles" (GARP®)[198] cited in this document, and is a recognized leader in the development of the records management profession.

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[196] P2-194 (Chapter 2 and 2A Attachments) PG&E SP 210.4-3 Retention of Records General Office Departments (03/01/1961)

[197] www.arma.org

[198] www.arma.org/garp/

The 1970s: The work undertaken by the government did not always impact the private sector. Organizations of the time, within certain sectors such as pharmaceuticals, energy, engineering, more attention was being paid to the development of records management programs to manage documents to prove that products and structures had been designed, developed, built to industry standards, and, in accordance with laws and regulations. To abide by the increasing number of new laws and regulations that contained rules and guidance on how long records should be kept, in-house records centers were being established to mirror those in the public sector, and documents were being sent to commercial storage companies for retention. With the introduction of word processors, and, as the ability to create and print documents accelerated, linked with longer time periods being introduced to retain documents, the need for more records management controls, and a greater awareness of the need to file, maintain and retain documents became the status quo.

The 1980s: This decade saw both public and private sector introduce personal computers on every desktop. Printers were scattered around offices and consequently more and more paper appeared multiplying the numbers of the same document around the office. The Paperwork Reduction Act of 1980, via the Office of Management and Budget, resulted in authority being given to the Office of Information and Regulatory Affairs to regulate matters with regard to federal information, and to establish information policies in an attempt to reduce the amount of paperwork being handled by the government. Records Management had never been needed more than at this time.

The 1990s: With the introduction of more and more technology to assist organizations to gain efficiency and market and sell their products more easily, alongside a need to reduce operating costs, the early 1990's saw many records centers 'downsize' and staff were replaced with document management software and electronic storage systems that 'could do the record-keeping job more easily' removing the necessity for records clerks to file and maintain paper repositories. This proved to be a mistake as the paper mountains increased, the new electronic systems were not intuitive so people reverted to paper, and previously well managed paper filing systems fell into disarray.

The 2000s: The turn of the century saw an increase in technology and even more paper was being scattered across organizations as staff printed emails and copies of the same document over and over again. Filing and finding on desktop computers, laptops and eventually smart phones and tablets necessitated the recent introduction of robust searching tools and various applications to catalog; create taxonomies and try to manage retention and disposition of electronic records. Towards the late 2000s, content management and workflow products began to include records management in their applications requiring records managers and others with information governance responsibilities to manage the information lifecycle with electronic tools. Paper still abounds in certain organizations where legacy systems are held on paper. Organizations are recognizing that information held in their records is one of their major assets. Compliance, retention and disposition are at the forefront of every records management practitioner's job.

8.1.2. Retention

The retention and disposal of information is governed not only by business requirements but by laws and regulations related to the sector in which the business operates. So it is with the energy sector and records retention statements have been inserted in standards, rules, regulations and laws since 1913. The National Archives and Records Administration (NARA) issues clear guidelines on Records Management Sub Chapter B of 36 CFR Chapter XII parts 1220 to 1239.

Retention schedules are based on legal, regulatory or operational requirements, and establish trigger dates that authorize the dispatch of records to archival storage for long term retention or their destruction if no longer needed. PG&E operates in a number of highly regulated, safety-critical sectors and non-compliance with stringent privacy, security and retention requirements can give rise to hefty fines and penalties.

Defining retention rules

Finding and understanding the laws and regulations that govern the organization in relation to records retention is a lengthy research process. Finding all the sources can be challenging as knowledge of the subject matter; the work processes; and records management is needed to find, interpret and apply the stated rules. These rules regularly conflict with each other and can be ambiguous. Most often the retention periods stated are minimum time frames. Legislation and regulations that contain records retention statements can date back 100 years.[199] Rules governing engineering documentation and safety,[200] may be placed in a section on 'welding' or 'operations and maintenance' and the regulations[201] may cross refer to other legislation and standards.

As a general 'rule of thumb' "perhaps 30 per cent of the documents that an organization keeps are governed by laws and regulations. Of the rest, a further 20 per cent may have codes of practice or defined best practice rules that govern them, leaving the remaining 50 per cent with no rules whatsoever. Many of the statutes and regulations leave the decision on the actual length of time the record is kept up to the organization to decide, based on the needs for and use of the record in terms of the organization's business or sector."[202]

[199] Uniform Classification of Accounts for Gas Corporations prescribed by The Railroad Commission of the State of California adopted October 23 1912, effective January 1913

[200] ASME B31.1.8-1938

[201] 49 CFR part 192-917

[202] North, Alison – Managing Records Retention and Disposal US Edition - 2011

In sectors that have a need to focus on safety, such as the energy sector, the percentage of records governed by regulations increases as does the number of documents that contain sentences on record-keeping and retention / disposition. For these very reasons it is imperative that the person responsible for the development and maintenance of the records retention schedule is experienced not only in the records management principles but has full knowledge of the work that is undertaken and the documents that are created and maintained within each section of the organization. In the oil and gas sector, the records life cycle, often mirrors that of the asset life cycle, for example, pipeline, well and facility records are kept for as long as the asset is retained by the organization irrespective of the minimum legal retention periods set by statute. This is because the information is essential to effectively managing the asset lifecycle. The information has both evidential and business value - and can be as valuable to the organization at the end of the assets life, for example, during decommissioning, asset transfer or sale, as it was during installation.

Development of a retention schedule at a corporate level that only takes into consideration corporate records such as financial; human resources; company documents, is incomplete and can lead to complacency and a belief that the organization is completely compliant. Leaving the operating sections to interpret the regulations; develop their own retention schedules and, implement them; and store their own records (electronic and paper); in a consistent fashion without the benefit of a clear retention policy; and implementation guidelines with a monitoring, auditing and training program appended; and, identification of those responsible for the various parts of the program is negligent and can lead to inefficient record-keeping practices and unsafe decisions on the retention and disposal of records. Highly-governed sectors such as pharmaceuticals and financial services have clearer guidelines and more laws, regulations and codes of practice to follow. These sectors have formed groups across organizations to discuss and develop retention guidelines for their sector. In addition, professional bodies such as ARMA and many national archives provide assistance via their websites and publications.

8.1.3. Records Management Responsibilities

'Records management is a necessary part of the work of almost all employees within an organization'.[203] As such, records management policies must permeate all organizational levels, generate responsibilities and promulgate procedures and practices that need dedicated implementation and monitoring to ensure that the 'business need for evidence, accountability and information about its activities is met'.[204] Responsibilities may be centralized through a single point of authority, or decentralized and spread across the departments and sections. In either case, responsibilities must be clearly defined and assigned to ensure that the organization has a solid network that supports delivery of an effective the records management program.

[203] E. Shepherd and G. Yeo, *Managing records: a handbook of principles and practice*, London : Facet Publishing, p.1, 2003.

[204] Ibid.

Senior management support and endorsement together with adequate allocation of resources are essential. The International Organization for Standardization (ISO) has developed two new management systems standards for records aimed at senior management to 'get their commitment to provide the appropriate leadership, funds and people for the implementation of records management processes'.[205]

8.1.4. Poor records management and business risk

Where records are not properly managed they 'will often be inadequate for the purposes for which they are needed'.[206] Potential risks include loss or premature destruction of important records. Other types of risks include:

- Mismanagement and incoherent decision making due to lack of accurate and complete information;
- Lack of evidence, proof of rights and ownership of assets, and inability to protect the rights of employees and clients;
- Vulnerability in cases of litigation;
- Non-compliance with legal, statutory or regulatory requirements;
- Failure to handle confidential information with appropriate security and the possibility of unauthorized access or disposal taking place;
- Failure to protect vital records, leading to inadequate business continuity planning;
- Over-reliance on human memory and the experience of individual members of staff;
- Ad-hoc decision-making within work units working in isolation, lack of standardization in the way records are managed, creation of information silos, disruption and fragmentation of the information flow across the organization.

8.1.5. The Benefits of Records Management

A systematic approach to the management of records is essential in order for the organization to:

- Maintain corporate, personal or collective memory;
- Meet legislative and regulatory requirements;
- Conduct business in an orderly, efficient and accountable manner;
- Reduce risk of penalties from regulators for incomplete or poor record-keeping;
- Improve access to information access which may in turn improve productivity;
- Deliver services in a consistent and equitable manner;
- Support and document policy formation and managerial decision making;
- Provide consistency, continuity and productivity in administration;
- Provide continuity in the event of a disaster;

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[205] International Organization for Standardization, Corrected frequently asked questions on ISO/DIS 30300 and ISO/DIS 30301 documents, 2009.

[206] E. Shepherd and G. Yeo, Managing records: A handbook of principles and practices, London: 2003.

- Provide protection and support in litigation including the management of risks associated with the existence/lack of evidence of activity;
- Protect the interests of the organization and the rights of employees, clients and present and future stakeholders;
- Support and document current and future research and development activities, developments and achievements, as well as historical research.

Recent high-profile events reported in the press have questioned the credibility of even the largest companies. The most notable development in this area is the implementation of the Sarbanes-Oxley Act in 2002, and the Pipeline Safety Bill in 2012. These acts have focused attention on records management as a critical compliance issue with regard to corporate governance.

8.2. Appendix 2: Records-related issues in PG&E's Mapping Division

This appendix contains a summary of the records-related issues identified in PG&E's Mapping Division by PG&E's own management consultants, Pricewaterhouse Coopers (PwC). The table below contains extracts from the PwC draft Internal Report January 18, 2012, issued to CPUC as Data request 25[207] grouped by section/theme, for ease of reference.

Ref.	Theme/ Issue
I	**PEOPLE**
I-A	**Governance**
	Governance: Lack of formal governance structure (roles and responsibilities), policies, and procedures relating to the management of records and information. Informal or implied governance-centric practices, no true ownership and accountability of the lifecycle management of the records and information. **Processes**: Processes do not necessarily address where information is collected, created, updated, shared between groups, stored in electronic systems, or disposed. Defined process and ownership of control points do not exist to validate the information **Controls:** Separate quality assurance roles and processes are not defined. Quality control is undertaken by the Mappers themselves. **Retention:** Document Retention Strategies not aligned with GOV-7001S. Education related to retention periods and retention schedules is not consistent and not well communicated. Changes to regulations and standards are distributed via email in the form of bulletins often only to specific individuals (i.e. supervisors) and may never reach the relevant staff. **Metrics:** No formal internal auditing/monitoring of record and information management practices. No formal review of the information lifecycle management, governance and processes.
I-B	**Morale and Incentive**
	Loss of many experienced Mapping staff during recent business transformation (Mapper staff cuts from 217 down to 75, offset by increased productivity associated with, but prior to roll-out of GIS) Weak collaboration between groups that share information with one another (e.g. construction and mapping) Little accountability by groups that supply Mapping with data, to provide quality work packets to be mapped.
I-C	**Resource Constraints**
I-C-1	**Supervisors and Leads:** Supervisors spread too thin and often can't provide the support, guidance, education and communication to their leads.
I-C-2	**Mappers:** Mappers often take on other roles and responsibilities outside of core mapping (e.g. following up missing information with construction crews, taking calls from the field, and printing maps for other groups). Lack of resources to keep up with the workload and to catch up on the backlog (including posting maps, filing paperwork, and following up on outstanding information) **Backlogs:** Mapping backlog (unmapped jobs) exists but cannot be quantified. Additional Workloads (special projects and programs reduces their ability to perform core mapping responsibilities **Missing Information:** Job files that simply cannot be mapped as they were originally received with missing information (from PG&E or third party construction). Development's map (25 years old) missing 12 houses that exist on a certain street. **Standardization :** Perceived inconsistencies in Mappers roles and responsibilities and the manner and practice that work is carried out across the various sites.
I-C-3	**Clerks:** Clerks provide an inconsistent control function (e.g. reviewing forms for completeness and accuracy prior to paperwork being sent to mapping. High turnover of clerical staff contributes to inconsistencies.

[207] GasTransmissionSystemRecordsOII_DR_CPUC_025-Q02(i) Supplement - Summary of Information Management Key Themes: PG&E Gas Mapping Organization, Internal PG&E report produced by PwC. [Preliminary Draft as of January 18, 2012].

I-D	**Training and Education**
I-D-1	**Employee Training:** The existing mapping training program "MAP" contains modules that demonstrate outdated and obsolete techniques (ink and vellum) which are no longer as applicable to the day-to-day responsibilities of mapping and how they execute their work. Employees lack sufficient training on records retention requirements and processes. Some employees are not aware of how long to keep specific records, where to find this information, or even if a records retention schedule exists. Most employees were unaware of the specific record retention guidelines as defined by GOV-7001S.
I-D-2	**System Training:** Little to no effective training on widely used systems (SAP, GEMS, SharePoint, IGIS, ECTS, etc.) for the larger mapping population. Train-the-trainer techniques have been used with mixed results.
II	**PROCESS**
II-A	**Process, Procedure and Standardization** Lack of consistency in how processes are designed and communicated, and how different groups across offices understand and are accountable for their roles as inputs into the eventual mapping of a job.
II-A-1	**Standards, Procedures and Manuals:** The mapping manual is outdated and does not include current standards. It has not been updated since the late 80s/ early 90s and does not incorporate the update bulletins that are now issued Many mappers still retain old physical copies of the manual. While some Mappers have taken personal initiative to update their own manuals with new standards, most have not. **Distribution:** Bulletins are periodically sent out via email, but a comprehensive location with all the most current mapping standards is not readily available or known to exist. Bulletins are not distributed to all Mappers, only supervisors or specific groups of individuals. It is the supervisor's responsibility to filter and forward bulletins to the Mappers. If a supervisor fails to forward the bulletins, the Mappers may not be aware of any changes unless they proactively refer to the Technical Library. **Standardization:** Lack of standards in terminology and the use of forms across locations. Lack of consistency - in one office, regulation drawings are done manually and updated by pencil rather than in CAD.
II-A-2	**Resource Management Centers:** Perceived lack of standards around processes and procedures results in inconsistencies around what information is included in job folders. **Job Folders:** Job folders sent from RMC to Mappers often contain duplicated and unnecessary information. Mappers spend time removing and disposing of unnecessary information from the job folders. The process of transferring job folders between groups/individuals is tedious and inefficient. USPS is used to transfer physical files resulting in lost time / inefficiency and potentially lost paperwork. **Standardization :** The standard process for scanning jobs into SAP is not consistently followed. Job folders scanned into SAP by RMC clerks may not be complete, do not always contain the final versions of documents, and may be unreadable or unusable, or not scanned at all. The process for closing out jobs is inconsistent at the Resource Management Center (RMC) and in the field locations.
II-A-3	**Contractors:** Lack of controls over contractors cited for completeness, consistency, and quality of work.
II-A-4	**Leak Surveys:** Reports of areas missing from the leak survey schedules. Existing services and mains missing from maps and may not have been leak surveyed. Lack of standardization in terms of documents received from the field, tracking mechanisms, hard copy document storage, and general process for the execution of leak surveys.
II-A-5	**Map Corrections:** Lack of process and controls for field personnel submitting map corrections. The map correction process varies by location.
II-A-6	**Emergency Zones:** Varying practices around the management of information related to emergency zones and associated shutoff valves. For example, some offices maintain this information in SharePoint while others are maintaining hard copies. In some offices mapping houses physical emergency zone shutoff binders. In one office a large map was displayed that engineering was responsible for updating.
II-A-7	**Job Folders:** Lack of standardization of job folder contents and the order of the documents. Each office's practices for management and storage of job folders vary. Some locations have a backlog of job folders (work that still remains to be mapped due to lack of resources or to lack of information from the field that is still in the process of being retrieved) Many of the different areas that touch a particular job maintain their own folder of information as the job is passed along from function to function. Duplicate job folders and thus duplicate information can potentially exist between Gas Transmission Records, Division Offices, Engineering, Construction, and Billing.
II-A-8	**Vectorization:** A large portion of maps in GEMS have not been vectorized. This cause issues when Mappers are accessing maps in GEMS.
II-A-9	**Construction:** Lack of focus on paperwork quality and completeness, and there is no accountability or repercussions for incomplete paperwork. Mappers often feel as if they are doing part of construction's job by filling in or chasing down information that construction should have completed in the field. As-built drawings are not

	always included in the job folders and often the red-lined original estimates are substituted as the as-built, with a notation made on the map.
II-B	**Physical Records:** The Gas Service Record (GSR) form is not easy to use or read. The format has changed multiple times making it increasingly complicated with each change (e.g. The new Op Change Form does not contain a field to document the job tracking number.) **Tracking:** Physical security of documents is inadequate. "Out" cards are not consistently used and the process by which folders are "checked out" is not formalized. **Conditions:** Storage conditions of physical documents vary greatly from office to office (documents housed in boxes, file cabinets, desktops, inboxes, off-site locations, adjacent buildings, and external storage sheds/containers). Physical documents not stored in controlled environments risk damage from leaks or other conditions that may contribute to physical deterioration of documents and records. Location of certain records is often based on institutional knowledge of the local staff and varies from location to location. **Filing:** Records retrieved for litigation, regulatory, or the MAOP project may have been returned but not yet been re-filed. Local office personnel do not always re-file the records so they remain in the boxes in which they were returned.
II-C	**Archival and Retention:** Paper records are being kept indefinitely (i.e. there is no proactive effort to identify records that are eligible for disposition) even though permanent retention is not mandated for processes like Leak Survey. Not all documents have, however, been retained permanently, as proven through the MAOP validation project activities in the search for transmission pressure test records. **Missing Records:** There is no positive affirmation that records do exist; for example, missing records are often discovered when someone attempts to retrieve a record that is perceived not to exist. No action or understanding around record retention and the importance of purging records beyond their required retention period exists. **Retention**: Lack of formal guidance around what is an official Record versus a transient document. Application of this knowledge is inconsistent from office to office. No formal process for record/document disposition is in place. Records Retention and Policy related information is difficult to locate and found in multiple areas (intranet, technical library, paper standards manuals on desks, organization memory, etc.)[208]
II-D	**Metrics / Quality Control:** PG&E lacks the systems or processes to measure the mapping population and their responsibilities effectively. Mappers are measured in terms of their production time and not the quality of the services provided to their M&C and GC colleagues or the quality review activities undertaken.
II-E	**Access to Information:** Many Mappers spend at least half of their day searching for information (e.g., items that should have been placed into A-forms, GSRs and other forms, maps, job file data, standards, etc.) rather than actually performing core mapping functions. Some relocation of Mappers has occurred where a they have had to leave behind a portion or subset of records (documents/files/maps/etc.).Mappers then need to make trips to the old office to retrieve records, or waste time sending documents back and forth via the mail, or e-mail. **Job Folders:** There is no process for storing certain types of records other than job packets and the associated documents. For example, communications with the field may be stored in email or tracked by the lead in a spreadsheet. In some offices, the lead does all of the communicating with the field, in other offices it is individual Mappers. **Standardization:** Each office has different ideas about whether the most accurate tracking for outstanding jobs comes from SAP, a spreadsheet maintained by the lead, or perhaps what arrives in an inbox. Related paper and electronic records can be difficult to locate from office to office because of the unique process each office has created to ensure the Mappers have access to the information they need. **Storage Location**: Location and organization of physical records varies by location and is often only known to a few individuals performing the filing. This has been further complicated with the records pulled for the MAOP and other special projects after the San Bruno incident.

[208] As identified in the National Transportation Safety Board Report, "On June 9, 2011, the CPUC issued an order. . .The order requires operators to develop and file with the CPUC implementation plans to achieve orderly and cost-effective replacement or hydrostatic pressure testing of all gas transmission pipelines that have not been pressure tested. The proposed decision also provides requested guidance to PG&E in how it should complete its records-based MAOP determination and the limited uses for engineering assumptions." Pacific Gas and Electric Company Natural Gas Transmission Pipeline Rupture and Fire San Bruno, California September 9, 2010, P. 73. In light of the missing records and lack of formal retention guidance identified by the PWC report, a concern is raised about whether PG&E will create and successfully implement an effective Standard Practice to keep an accessible set of records that come from its MAOP validation efforts.

III	TECHNOLOGY
	The systems are not well integrated, contain duplicate information, and have significant data integrity (accuracy and completeness) issues. Lack of sufficient and knowledgeable IT support for Mappers and for technical systems used and relied upon in the field.
III-A	**ECTS:** Many offices had no knowledge of ECTS. For those offices aware of ECTS, all reported issues with the usability of the front end, search functionality, poor quality of scans, duplicate information, missing information and other issues. Some of these issues may be due to lack of training on the use of the system.
III-B	**GEMS:** Some map scans in GEMS are of poor quality and unreadable; most distribution mapping offices retain and use the original mylar drawings to combat the issue. This causes a divergence in the information as some use the updated GEMS map, and others use the outdated mylar print. **Scanning**: GEMS is generally acknowledged as the system of record, however, offices retain mylar prints because although scanning quality is improving, there is content written in margins and the margins were not part of the original scanning process. Mappers frequently refer back to mylars. Many offices cited at least weekly reference to mylar if not daily reference. **Standardization:** Labels or symbology on maps may differ from division to division (e.g. the lack of standard for valve numbering procedures). Maps are inconsistent between Gas Transmission and Gas Distribution, as well as between divisions. Most diagrams are still in manual form and have not been vectorized for easy reading or electronic retrieval.
III-C	**Intranet & Technical Library (TIL):** The PG&E Intranet site and the Technical Information Library (TIL) is not user friendly, not meaningfully organized, difficult to locate information, and lacks adequate search functionality. (e.g. When provided with the PG&E Standard number "GOV-7001S" no search results were return even when various combinations of "GO 7001 S" or "GO 7001S" are run.
III-D	**SAP:** SAP is generally perceived to be the system with the least amount of data integrity issues, however, its extensive functionality has not been leveraged by the organization. "Hidden" job packages exist that are not entered into SAP because they are missing information from construction and Mappers would be unfairly penalized for the lack of job completion. There is no reliable tracking of the "Completeness of records" in SAP, other than anecdotal information from local offices.
III-E	**SharePoint:** SharePoint has not been fully developed. It is used as another shared drive in most cases, albeit more cumbersome and difficult to use than a share drive. Some staff described the leak survey tracking in SharePoint as painful, inefficient. Lack of collaboration across sites is a challenge, as is the lack of controls or guidance for SharePoint usage overall. **Shared Drives:** Shared Drives are used by many groups to store legacy data or duplicative data that may also be in SharePoint or other systems, as it is easier and more convenient for staff to access.
III-F	**IGIS:** The process of entering A-Forms is difficult and inefficient due to IGIS entry form not directly corresponding to the hard copy A-Form (e.g., fields in different order, different field names, and required fields in IGIS but generally not completed or required on the A-Form). **Data Validation:** Validation of data entered in the IGIS form does not occur until the final page has been submitted which results in the user searching the form for missing fields. This has been further corroborated by instances in which the A-Form differed from what was entered into IGIS.
III-G	**Non-Leak Information System (NLIS):** Not all offices reported entering jobs into NLIS. Those offices that reported using the system indicated that the necessary information to complete the form is not always provided to the Mappers. New addresses not in the system take roughly one week to get updated in the system and in some instances may cause delays in entering jobs.

8.3. Appendix 3: Extract from PG&E Standard Practices Documents 1951-2010

Responsible Party	Responsible for	Date Document issued	Issuing Party
General Office Department Heads and Division Managers	Supervision of the preservation and indexing of records	17 May 1951[209]	Secretary
No responsible party cited but Records Management Consultant cited as available to assist and distribution to company officers and department heads	Destruction of all general office records which have outlived their usefulness to the company from a legal, operating and administrative standpoint	1 March 1959[210]	President
Delegated responsibility to Divisions for disposal of records – distributed to company officers; department heads; division managers; records management advisors	Destruction of Division records held in Divisions	1 August 1959[211]	President
Delegated responsibility to each General Office Department. – distributed to Company Officers; department heads and San Francisco Division Manager	To issue its own retention schedule and send to Records Center Supervisor with RM Consultant available for advice; Destruction of general office records and introduction of records center as storage for records that must be retained for a period of time	1March 1961[212]	Manager, Department on Procedures and Organization
General Office Department continuing responsibility– no distribution list only header "General Office"	To prepare a records retention schedule; To achieve maximum economy in the storage of inactive records and destroy when legally permissible those records that are no longer needed	1 July 1968[213]	Secretary
Each General Office department to delegate one person to act as Department Representative	To be responsible for the transfer of records to Records Center, maintain an inventory of record locations at the Center and act as liaison between the department and the Records Center; To achieve maximum economy in the storage of inactive records and destroy when legally permissible those records that are no longer needed	1 Nov 1976[214]	Secretary
All Divisions to appoint a Division Records Management Advisor; Supervisor of Records	To check periodically to see that records are destroyed in accordance with retention periods in FPC Regulations and CPUC Resolutions	November 1 1976[215]	

[209] P2-191- (Chapter 2 and 2A Attachments) PG&E Circular Letter Ex642: Federal Power Regulations to Govern the Preservation of Records (05/17/1951)

[210] P2-192 (Chapter 2 and 2A Attachments) PG&E SP 210.4-3 Retention of Records General Office Departments (03/01/1959)

[211] P2-193 (Chapter 2 and 2A Attachments) PG&E SP 210.4-4 Retention of Records Divisions (08/01/1959)

[212] P2-194 (Chapter 2 and 2A Attachments) PG&E SP 210.4-3 Retention of Records General Office Departments (03/01/1961)

[213] P2-196 (Chapter 2 and 2A Attachments) PG&E SP 210.4-3 Retention and Destruction of Records General Office Departments (07/01/1968)

[214] P2-199 (Chapter 2 and 2A Attachments) PG&E SP 210.4-3 Retention and Destruction of Records General Office Departments (11/01/1976)

[215] P2-200 (Chapter 2 and 2A Attachments) PG&E SP 210.4-4 Retention and Destruction of Records Divisions (11/01/1976)

Responsible Party	Responsible for	Date Document issued	Issuing Party
	To provide staff assistance to all divisions in all matters pertaining to records retention. . ..and other areas of the records management field		
Mr. L F Badet Supervisor of Records	He is referenced in letter to Company Officers and Department Heads (long circulation list of names attached)	January 3 1977[216]	Secretary
Each General Office Department to delegate one person to act as Department Representative	To be responsible for the transfer of records to Records Center; maintain an inventory of record locations at the Center and act as liaison between the department and the Records Center; To achieve maximum economy in the storage of inactive records and destroy when legally permissible those records that are no longer needed; Departments should maintain an accurate inventory of records in storage at the Records Center	August 1 1977[217]	Secretary
Department Heads – General Office Departments Supervisor of Records	Determine retention periods under requirements show in this standard practice Ensure that records under their care and custody are retained for the periods specified by regulatory requirements indicated in this standard practice Transfer records to Record Storage Facilities as directed by this standard practice Review the destruction notice for records under their jurisdiction Supervise the operation of Company Record Storage Facilities Prepare and distribute Record Destruction Notices Administer the Record Retention Program and respond to questions or provide consultation when requested	June 1 1986[218]	VP and Corporate Secretary
Regional Managers or their Designees - Operating Regions	Determine retention periods under requirements shown in this standard practice Ensure that records under their care and custody are retained for the periods specified by regulatory requirements indicated in this standard practice Ensure that records under their jurisdiction are promptly and properly destroyed when it	June 1 1986[219]	VP and Corporate Secretary

[216] P2-201 (Chapter 2 and 2A Attachments) PG&E Memorandum re new standard practice 210.4-3 Retention of Records (01/03/1977)

[217] P2-202 (Chapter 2 and 2A Attachments) PG&E SP 210.4-3 Retention and Destruction of Records General Office Departments (08/01/1977)

[218] P2-204 (Chapter 2 and 2A Attachments) PG&E SP 210.4-3 Retaining and Destroying Records – General Office Departments (06/01/1986)

[219] P2-205 (Chapter 2 and 2A Attachments) PG&E SP 210.4-4 Retaining and Destroying Records – Operating Regions (06/01/1986)

Responsible Party	Responsible for	Date Document issued	Issuing Party
Supervisor of Records	is legally permissible to do so Administer the Record Retention Program and respond to questions or provide consultation when requested		
Corporate Secretary	Responsible for issuing, updating, and monitoring compliance with the corporate records policy that applies to PG&E and its subsidiaries...plus additional responsibilities around records center and safety and accessibility	June 13 1986[220]	unknown
Officers; business unit general managers; region VPs; division managers; managers or designees	Responsible for compliance with accounting record retention regulations and preservation procedures and schedules	July 1 1991[221]	Controller
Managers of Departments having major direction over the operation of subsidiary companies	Responsible for a number of actions relating to the filing and preservation of records of the subsidiary companies	January 2 1993[222]	Corporate Secretary
Regional VPs or their designees Supervisor of Records	Determine retention periods under requirements shown in this standard practice Ensure that records under their care and custody are retained for the periods specified by regulatory requirements indicated in this Standard Practice Ensure that records under their jurisdiction are promptly and properly destroyed when it in legally permissible to do so. Administer the Record Retention Program and respond to questions or provide consultation when requested	January 2 1993[223]	Corporate Secretary
PG&E Departments and Subsidiaries: - Officers and their designees - Supervisor of Records	Establish retention periods under requirements shown in this Standard Practice Ensure that records under their care and custody are retained for the periods specified by regulatory requirements indicated in this Standard Practice Transfer records to Record Storage Facilities as directed by this Standard Practice Review the destruction notice for records under their jurisdiction Supervise the operation of Company Record	April 1 1994[224]	Corporate Secretary

[220] P2-206 (Chapter 2 and 2A Attachments) PG&E Corporate Records – Statement of Policy (06/13/1989)

[221] P2-208 (Chapter 2 and 2A Attachments) PG&E SP 210.4-1 Preservation of Accounting Records (07/01/1991)

[222] P2-209 (Chapter 2 and 2A Attachments) PG&E SP 210.4-2 Correspondence and Records of PG&E Subsidiary Companies (01/02/1993)

[223] P2-210 (Chapter 2 and 2A Attachments) PG&E SP 210.4-4 Retaining and Destroying Records – Operating Regions (01/02/1993)

[224] P2-211 (Chapter 2 and 2A Attachments) PG&E SP 210.4-3 Retaining and Destroying Records – All PG&E Departments and Subsidiaries (04/01/1994)

Responsible Party	Responsible for	Date Document issued	Issuing Party
	Storage facilities Prepare and distribute Record Destruction Notices Administer the Record Retention Program and respond to questions and provide consultation when requested		
Corporate Secretary Officers of PG&E and all subsidiaries	Responsible for issuing, updating, and monitoring compliance with the corporate records policy that applies to PG&E and its subsidiaries. Provide originals of all corporate records as defined on page E3.4-1 to corporate secretary, or as delegated by the Corporate Secretary who retains records in a safe and accessible manner	May 10 1996[225]	Unknown – *subsequent documents reference a corporate policy manual with same E3.4 nomenclature*
Officers or their designees Supervisor of Records (Mr. L Badet still in post)	Monitor compliance with the corporate standard practice CSP4 Administers the Record Retention Program.....	July 1 1996[226]	Corporate Secretary
Information Sponsors Supervisor of Records (Mr. L Badet still in post)	Ensure that records are retained as required by law Administers the Record Retention Program	October 22 1998[227]	Corporate Secretary
Information Sponsors Supervisor of Records (Mr. L Badet still in post)	Ensure that records are retained as required by law Administers the Record Retention Program	October 20 2000[228]	Corporate Secretary
Each Officer Corporate Secretary [Department]	Ensures that records in his or her organization are retained as required by law Administers record retention program	October 1 2008[229]	Corporate Secretary
Officers Corporate Secretary office	Ensure that records under their jurisdiction are retained for appropriate periods Each officer certifies (annually) that his or her organization is in compliance with the requirements of the standard Distributes record retention and disposal standard, every September, to all officers of PG&E Corporation and its affiliates and subsidiaries	October 1 2010[230]	VP Corporate Governance and Corporate Secretary

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[225] P2-214 (Chapter 2 and 2A Attachments) PG&E Corporate Records Policy Statement (05/01/1996)

[226] P2-215 (Chapter 2 and 2A Attachments) PG&E CSP4: Corporate Standard Practice 4 Record Retention (07/01/1996)

[227] P2-216 (Chapter 2 and 2A Attachments) USP4 Utility Standard Practice – Record Retention and Disposal (10/22/1998)

[228] P2-220 (Chapter 2 and 2A Attachments) PG&E USP4: Utility Standard Practice 4 Record Retention and Disposal (10/20/2000)

[229] P2-228 (Chapter 2 and 2A Attachments) PG&E USP4: Utility Standard Practice 4 Record Retention and Disposal (10/01/2008)

[230] P2-4 and P2-233 (Chapter 2 and 2A Attachments) PG&E GOV7001S Record Retention and Disposal Standard (10/01/2010)

8.4. Appendix 4: GARP® Principles

This section contains a detailed explanation of the eight Generally Accepted Record-keeping Principles® (GARP®) defined by ARMA International,[231] that have been used as a basis of an information management maturity assessment of PG&E's Gas Transmission Division prior to the San Bruno pipeline rupture and fire. The eight Generally Accepted Record-keeping Principles (GARP®) include Accountability; Compliance; Transparency; Availability; Integrity; Retention; Protection; and Disposition. The characteristics of each of these Principles is discussed in detail overleaf and presented together with their respective benchmarking criteria.[232, 233]

To support the introduction and use of GARP®, ARMA International state that "The principles of record-keeping have been well developed by those who are fully involved in records and information management. They form the basis upon which every effective records program is built and are the yardstick by which any record-keeping program is measured. Regardless of whether an organization or its personnel are aware of them, they form the basis upon which that organization's record-keeping will one day be judged. It is in the general interest of all organizations, to be fully aware of these principles and to manage records and information assets in accordance with them. ARMA International published these eight Generally Accepted Record-keeping Principles® to foster general awareness of record-keeping standards and principles and to assist organizations in developing records systems that comply with them.

These principles are comprehensive in scope, but general in nature. They are not addressed to a specific situation, industry, country, or organization, nor are they intended to set forth a legal rule for compliance that must be strictly adhered to by every organization in every circumstance. They are intended to set forth the characteristics of an effective record-keeping program, while allowing flexibility based upon the unique circumstances of an organization's size, sophistication, legal environment, or resources. The objectivity of the principles, combined with a reasonable approach to applying them, will yield sound results for any organization: a responsive, effective, and legally compliant record-keeping system".

[231] http://www.arma.org/garp/index.cfm

[232] http://www.arma.org/garp/metrics.cfm

[233] http://www.arma.org/garp/Garp%20maturity%20Model.pdf

Principle of Accountability[234]

An organization shall assign a senior executive who will oversee a record-keeping program and delegate responsibility to appropriate individuals, adopt policies and procedures to guide personnel, and ensure auditability.

- The senior executive in charge should establish a method to design and implement a structure to support the record-keeping program.
- Governance structure should be established for program development and implementation.
- Necessary components include an accountable person and a developed program.
- A record-keeping program should have documented and approved policies and procedures to guide its implementation.

Auditability enables the program to validate its mission and be updated as appropriate. A basic premise to sound record-keeping is that within each organization, someone is designated as responsible for the overall program. This does not have to be a full-time responsibility, but it does need to be formally designated to someone in a senior-level position who has access to other senior executives and can ensure program implementation across the organization. The accountable senior executive will oversee the overall record-keeping program, although this executive often will assign or designate other personnel to roles and tasks involved in different parts of the record-keeping program.

A major responsibility for this executive is program development. As an on-going program, record-keeping requires the program to be monitored for compliance and to identify any areas requiring improvement. The matters identified during the monitoring lead to program improvements, which the senior executive will oversee at the appropriate level. Governance should be established through the organization, assigning defined roles and responsibilities to different staff so it is clear where responsibilities reside and how the chain of command works to build, implement, and upgrade the record-keeping program. For example, sub-committees can be designated to help build policies or to define and implement technology.

For staff to know how to implement the record-keeping program, it is essential to have program policies and procedures that are documented, formally approved, and communicated to personnel. Updates to the policy and procedures should be available to staff, as should record-keeping training. All of this is designed to further standardize the program across the organization. This standardization enhances staff's efforts to effectively implement the record-keeping program.

[234] http://www.arma.org/garp/accountability.cfm

Auditability is the process designed to prove the program is accomplishing its goals, while seeking areas for improvement to further protect the organization and its records.

- Staff should be able to demonstrate program awareness.
- Records should be retained for the right amount of time and disposed of when no longer required.
- Policies should be kept up-to-date and cover all records media.
- Auditing should verify the status of complying with these standards.

An organization's record-keeping audits should be reported to the board of directors (or its audit committee) to show program adherence in accordance with documented policies and procedures, requirements (for retention, privacy, access to records, and access controls, for example), and the organization's goals for its record-keeping program.

GARP ® Principle: Accountability	**Accountability:** A senior executive (or person of comparable authority) oversees the record-keeping program and delegates program responsibility to appropriate individuals. The organization adopts policies and procedures to guide personnel, and ensure the program can be audited.
Level 1 (Sub-Standard)	No senior executive (or person of comparable authority) is responsible for the records management program. The records manager role is largely non-existent or is an administrative and/or clerical role distributed among general staff.
Level 2 (In Development)	No senior executive (or person of comparable authority) is involved in or responsible for the records management program. The records manager role is recognized, although he/she is responsible for tactical operation of the existing program. In many cases, the existing program covers paper records only. The information technology function or department is the de facto lead for storing electronic information, but this is not done in a systematic fashion. The records manager is not involved in discussions of electronic systems.
Level 3 (Essential)	The records manager is an officer of the organization and is responsible for the tactical operation of the on-going program on an organization-wide basis. The records manager is actively engaged in strategic information and record management initiatives with other officers of the organization. Senior management is aware of the program. The organization has defined specific goals related to accountability.
Level 4 (Proactive)	The records manager is a senior officer responsible for all tactical and strategic aspects of the program. A stakeholder committee representing all functional areas and chaired by the records manager meets on a periodic basis to review disposition policy and other records management-related issues. Records management activities are fully sponsored by a senior executive.
Level 5 (Transformational)	The organization's senior management and its governing board place great emphasis on the importance of the program. The records management program is directly responsible to an individual in the senior level of management, (e.g. chief risk officer, chief compliance officer, chief information officer) OR, a chief records officer (or similar title) is directly responsible for the records management program and is a member of senior management for the organization. The organization's stated goals related to accountability have been met.

Principle of Compliance[235]

The record-keeping program shall be constructed to comply with applicable laws and other binding authorities, as well as the organization's policies.

It is the duty of every organization to comply with applicable laws, including those for maintaining records. An organization's credibility and legal standing rest upon its ability to demonstrate that it conducts its activities in a lawful manner. The absence or poor quality of the records required to demonstrate this damages an organization's credibility and may impair its standing in legal matters or jeopardize its right to conduct business. The duty of compliance affects a record-keeping system in two ways:

1) The record-keeping system must contain information showing that the organization's activities are conducted in a lawful manner.

2). The record-keeping system is itself subject to legal requirements such as requirements to maintain tax or other records.

It follows from this that every organization must:

- Know what information must be entered into its records to demonstrate that its activities are being conducted in a lawful manner
- Enter that information into its records in the manner prescribed by law
- Maintain its records in the manner and for the time prescribed by law

An organization that is subject to codes of conduct, ethics rules, or other authorities is subject to a duty to comply with them also. To the extent that record-keeping is required to demonstrate compliance with the code or rules, or the organization's records system is itself subject to the code or rules, the organization's records must be maintained in accordance with them. A policy is an internal rule of conduct for the organization and the organization's own statements of what it deems to be correct conduct. By its nature, a policy imposes a duty of compliance upon the organization and its personnel. To comply with laws and other authorities, an organization must adopt and enforce suitable policies to direct and control its record-keeping. The precise manner and duties of compliance will vary from organization to organization. Some organizations may be subject to multiple laws and legal doctrines, as well as codes of ethics and other authorities. This may, in turn, require the organization to adopt and enforce multiple and stringent policies for record-keeping. An organization that is subject to fewer regulations may need fewer record-keeping policies to maintain compliance. Every organization, however, should draft and enforce its policies and conduct its activities in a manner reasonably calculated to ensure compliance with the totality of authorities applicable to it.

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[235] http://www.arma.org/garp/compliance.cfm

GARP ® Principle: Compliance	**Compliance:** The record-keeping program shall be constructed to comply with applicable laws and other binding authorities, as well as the organization's policies.
Level 1 (Sub-Standard)	There is no clear definition of the records the organization is obligated to keep. Records and other business documentation are not systematically managed according to records management principles. Various groups of the organization define this to the best of their ability based on their interpretation of rules and regulations. There is no central oversight and no consistently defensible position. There is no defined or understood process for imposing "holds."
Level 2 (In Development)	The organization has identified the rules and regulations that govern its business and introduced some compliance policies and record-keeping practices around those policies. Policies are not complete and there is no apparent or well-defined accountability for compliance. There is a hold process, but it is not well-integrated with the organization's information management and discovery processes
Level 3 (Essential)	The organization has identified all relevant compliance laws and regulations. Record creation and capture are systematically carried out in accordance with records management principles. The organization has a strong code of business conduct which is integrated into its overall information governance structure and record-keeping policies. Compliance and the records that demonstrate it are highly valued and measurable. The hold process is integrated into the organization's information management and discovery processes for the "most critical" systems. The organization has defined specific goals related to compliance.
Level 4 (Proactive)	The organization has implemented systems to capture and protect records. Records are linked with the metadata used to demonstrate and measure compliance. Employees are trained appropriately and audits are conducted regularly. Records of the audits and training are available for review. Lack of compliance is remedied through implementation of defined corrective actions. The hold process is well-managed with defined roles and a repeatable process that is integrated into the organization's information management and discovery processes.
Level 5 (Transformational)	The importance of compliance and the role of records and information in it are clearly recognized at the senior management and board levels. Auditing and continuous improvement processes are well-established and monitored by senior management. The roles and processes for information management and discovery are integrated. The organization's stated goals related to compliance have been met. The organization suffers few or no adverse consequences based on information governance and compliance failures.

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Principle of Transparency[236]

The processes and activities of an organization's record-keeping program shall be documented in an understandable manner and be available to all personnel and appropriate interested parties.

Many parties have a legitimate interest in understanding the processes that govern the management of a record-keeping program and the activities undertaken within it. In addition to the organization itself and its personnel, those parties include but are not limited to government authorities, auditors and investigators, litigants, and, for some organizations, the general public.

It is in the best interest of every organization, and of society in general, that all parties clearly understand:

- The organization conducts its activities in a lawful and appropriate manner.
- The record-keeping system accurately and completely records the activities of the organization.
- The record-keeping system is itself structured in a lawful and appropriate manner.
- Activities conducted to implement the record-keeping program are conducted in a lawful and appropriate manner.

The clearest and most durable evidence of these things are records. In the case of a record-keeping program, those records include record-keeping policies and procedures and transactional records of the activities undertaken during the course of the record-keeping program. To ensure that interested parties will have confidence in them, records documenting the record-keeping program must themselves adhere to the fundamentals of records management. They should:

- Document the principles and processes that govern the program
- Accurately and completely record the activities undertaken to implement the program
- Be written or recorded in a manner that clearly sets forth the information recorded
- Be readily available to legitimately interested parties

The information recorded in these records and the extent to which they are available to interested parties will vary depending upon the circumstances of the organization.

An organization that is subject to open records laws may need to make all records available to any person upon request. Other organizations may have a legitimate need to protect confidential or proprietary information, and they may therefore reasonably put in place procedures designed to control access to information. Complex and highly regulated record-keeping systems may require extensive records documenting them. Simple systems may require only a few. In each case, however, the rationales and outcomes should be clear to legitimately interested parties.

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[236] http://www.arma.org/garp/transparency.cfm

Every organization must therefore create and manage the records documenting its record-keeping program to ensure that the structure, processes, and activities of the program are apparent and understandable to legitimately interested parties and that the records documenting the program and its activities are reasonably available to them.

GARP ® Principle: Transparency	Transparency: The processes and activities of an organization's record-keeping program are documented in a manner that is open and verifiable and is available to all personnel and appropriate interested parties
Level 1 (Sub-Standard)	It is difficult to obtain information about the organization or its records in a timely fashion. No clear documentation is readily available. There is no emphasis on transparency. Public requests for information, discovery for litigation, regulatory responses, or other requests (e.g., from potential business partners, investors, or buyers) cannot be readily accommodated. The organization has not established controls to ensure the consistency of information disclosure. Business processes are not well defined.
Level 2 (In Development)	The organization realizes that some degree of transparency is important in its record-keeping for business or regulatory needs. Although a limited amount of transparency exists in areas where regulations demand transparency, there is no systematic or organization wide drive to transparency.
Level 3 (Essential)	Transparency in record-keeping is taken seriously and information is readily and systematically available when needed. There is a written policy regarding transparency. Employees are educated on the importance of transparency and the specifics of the organization's commitment to transparency. The organization has defined specific goals related to transparency.
Level 4 (Proactive)	Transparency is an essential part of the corporate culture and is emphasized in training. The organization monitors compliance on a regular basis.
Level 5 (Transformational)	The organization's senior management considers transparency as a key component of information governance. The organization's stated goals related to transparency have been met. The organization has implemented a continuous improvement process to ensure transparency is maintained over time. Software tools that are in place assist in transparency. Requestors, courts, and other legitimately interested parties are consistently satisfied with the transparency of the processes and the response

Principle of Availability[237]

An organization shall maintain records in a manner that ensures timely, efficient, and accurate retrieval of needed information.

Successful and responsible organizations must have the ability to identify, locate, and retrieve the records and related information required to support its on-going business activities. These records are used by:

- Individuals and groups to reference, share, and support their work
- Legal and compliance for discovery and regulatory review purposes
- Numerous corporate functions to validate management decisions and account for the resources of the organization.

Having the right information available at the right time depends upon an organization's ability to nimbly search through enormous volumes of information. As more routine business transactions are being conducted exclusively in electronic environments like e-mail, shared local area network drives, collaboration spaces, and websites, this is becoming increasingly difficult to sustain. These electronic environments offer a high degree of individual flexibility in how employees organize the materials they collect on a daily basis. However, this same flexibility results in expensive, time-consuming, and labor intensive difficulties when specific pieces of electronic information are needed for business or regulatory purposes, months and years after they were originally created. These difficulties are further complicated if the records required are those of employees who have left the organization or of vendors who previously provided records custody for the organization. Pinpointing complete and accurate information depends on: 1) having an efficient and intuitive set of methods and tools to organize the records of the organization and 2) providing employees and agents with sufficient training to utilize these tools successfully. Information must be described during the capture, maintenance, and storage processes in such a way as to make retrieval effective and efficient. A routine approach to capturing descriptive information about the records (known as "metadata") must be documented and utilized in all records systems. An added complication with electronic information is that even when the media on which it is recorded is available, its accessibility on that media can be uncertain due to its inherent fragility and impermanence. Electronic information needs to be routinely backed up to ensure that it can be restored if there is a disaster, a system malfunctions, or the data becomes corrupted. It also needs to be constantly migrated to currently supported hardware and software to sustain its on-going accessibility. To effectively manage the availability of its information assets at a reasonable cost, an organization should in the normal course of business regularly remove obsolete or redundant records and related information from its information systems. This will not only make those remaining records, which have on-going value to the organization, more identifiable and accessible, but it will also enhance system performance and reduce the maintenance costs of storage, back up, and migration. However,

[237] http://www.arma.org/garp/availability.cfm

removing unneeded information should occur in adherence with the organization's records retention policies, which should also provide for suspending disposition in the event of pending or on-going litigation or audit.

An organization's personnel are more likely to retrieve and use information for better decision making and more effective work if it has well-designed storage processes and access to understandable, retrievable, relevant, and consistent information. With properly structured information, personal productivity is improved, storage costs are minimized, and the reliability and speed of retrieval are optimized. Further, complete and accessible records in a well-managed environment minimize inconsistent and erroneous interpretation of the facts, simplify legal processes and regulatory investigations, and protect valuable information from being lost, corrupted, or stolen.

GARP ® Principle: Availability	Availability: An organization shall maintain records in a manner that ensures timely, efficient, and accurate retrieval of needed information.
Level 1 (Sub-Standard)	Records are not readily available when needed and/or it is unclear who to ask when records need to be produced. It takes time to find the correct version, the signed version, or the final version, if it can be found at all. The records lack finding aides: indices, metadata, and locators. Legal discovery is difficult because it is not clear where information resides or where the final copy of a record is located.
Level 2 (In Development)	Record retrieval mechanisms have been implemented in certain areas of the organization. In those areas with retrieval mechanisms, it is possible to distinguish between official records, duplicates, and non-record materials. There are some policies on where and how to store official records, but a standard is not imposed across the organization. Legal discovery is complicated and costly due to the inconsistent treatment of information.
Level 3 (Essential)	There is a standard for where and how official records and information are stored, protected, and made available. Record retrieval mechanisms are consistent and contribute to timely records retrieval. Most of the time, it is easy to determine where to find the authentic and final version of any record. Legal discovery is a well-defined and systematic business process. The organization has defined specific goals related to availability.
Level 4 (Proactive)	There are clearly defined policies regarding storage of records and information. There are clear guidelines and an inventory that identifies and defines the systems and their information assets. Records and information are consistently and readily available when needed. Appropriate systems and controls are in place for legal discovery. Automation is adopted to facilitate the implementation of the hold process.
Level 5 (Transformational)	The senior management and board levels provide support to continually upgrade the processes that affect record availability. There is an organized training and continuous improvement program. The organization's stated goals related to availability have been met. There is a measurable ROI to the business as a result of records availability

Principle of Integrity[238]

A record-keeping program shall be constructed so the records and information generated or managed by or for the organization have a reasonable and suitable guarantee of authenticity and reliability.

Integrity of a record is directly related to the ability to prove that a record is authentic and unaltered. *Authenticity* requires proof that a document comes from the person, organization, or other legal entity claiming to be its author or authorizing authority. An organization's executives are ultimately responsible for business records, as they are strategic and operational assets. Proper corporate governance and integrity of the information are important, and it is necessary to maintain the authenticity of records in all media over time. Investors and government regulators alike should expect the integrity of an organization's records and information.

Integrity of records in a record-keeping environment should include the following:

- Correctness of and adherence to the policies and procedures of the organization
- Reliability of the information management training and direction given to the employees who interact with all systems
- Reliability of the records created
- An acceptable audit trail
- Reliability of the systems that control the record-keeping including hardware, network infrastructure, and software

Correctness of and adherence to the policies and procedures of the corporation: To defend corporate governance and achieve legal and regulatory compliance, organizations must have implemented formal record-keeping policies and procedures that have been approved by senior management. If formal support has not been obtained, records may be at risk of not being accepted in evidentiary value.

Reliability of the information management training: All employees are responsible to comply with the records management program and should be trained on the meaning, importance, and usage of the corporate policies and procedures.

Reliability of the records created: To ensure records are created, used, and managed in the usual and ordinary course of business, organizations must have consistent record-keeping practices throughout the records life cycle.

[238] http://www.arma.org/garp/integrity.cfm

An acceptable audit trail: Audit trails are essential in proving reliability of the record-keeping actions of the organization. Acceptable audit and quality assurance processes should be in place.

Reliability of the system: The record-keeping system must be reliable to prove reliability and integrity of the records. A record is only as reliable as the system in which it is maintained

GARP ® Principle: Integrity	Integrity: A record-keeping program shall be constructed so the records and information generated or managed by or for the organization have a reasonable and suitable guarantee of authenticity and reliability.
Level 1 (Sub-Standard)	There are no systematic audits or defined processes for showing the origin and authenticity of a record. Various organizational functions use ad hoc methods to demonstrate authenticity and chain of custody, as appropriate, but their trustworthiness cannot easily be guaranteed.
Level 2 (In Development)	Some organizational records are stored with their respective metadata that demonstrate authenticity; however, no formal process is defined for metadata storage and chain of custody. Metadata storage and chain of custody methods are acknowledged to be important, but are left to the different departments to handle as they determine is appropriate.
Level 3 (Essential)	The organization has a formal process to ensure that the required level of authenticity and chain of custody can be applied to its systems and processes. Appropriate data elements to demonstrate compliance with the policy are captured. The organization has defined specific goals related to integrity.
Level 4 (Proactive)	There is a clear definition of metadata requirements for all systems, business applications, and paper records that are needed to ensure the authenticity of records. Metadata requirements include security and signature requirements and chain of custody as needed to demonstrate authenticity. The metadata definition process is an integral part of the records management practice in the organization
Level 5 (Transformational)	There is a formal, defined process for introducing new record-generating systems and the capture of their metadata and other authenticity requirements, including chain of custody. This level is easily and regularly audited. The organization's stated goals related to integrity have been met. The organization can consistently and confidently demonstrate the accuracy and authenticity of its records.

Principle of Retention[239]

An organization shall maintain its records and information for an appropriate time, taking into account legal, regulatory, fiscal, operational, and historical requirements.

Business and government create enormous quantities of records each business day. To control the growth of these records, an organization needs a program to help maintain and destroy records that are no longer needed. Records retention programs specify the length of time business records must be retained. The retention program is based on the concept that information has a *life cycle*, which is the time period from the creation of a record to its final disposition.

Records document an organization's business operations and are essential to effectively managing that business. The ability to properly and consistently retain records is especially important today, as most records being created and stored are in electronic form.

Organizations make retention decisions based on the content and purpose of records. Retention periods are determined by following these requirements:

- **Legal and regulatory** – Federal, state, local, and even international laws mandate the retention of records and information for a specific period of time. To comply with these extensive laws and regulations, an organization must conduct legal research in consultation with legal counsel to determine all records retention requirements. Laws and regulations establish the minimum retention period for those records to which they pertain. Failure to comply with laws and regulations may result in costly penalties and loss of legal rights.

- **Fiscal** – Records that have financial or tax value must be retained to ensure the timely payment of obligations and the proper receipt of receivables, as well as to support the organization's financial audits and tax returns. Legal research and consultation with legal counsel must be completed to satisfy fiscal retention requirements.

- **Operational** – Once legal, regulatory, and fiscal requirements have been established, an organization must determine how long records are needed to satisfy its business needs. This is usually determined by interviewing the person(s) most knowledgeable about the operational value of each record type.

- **Historical** – Records that depict the history of an organization should be preserved for the life of that organization. Examples of historical records include articles of incorporation, bylaws, charters, and board of directors' minutes. Historical records normally constitute a very small percentage of an organization's total records volume.

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[239] http://www.arma.org/garp/retention.cfm

Once its records retention requirements are determined, an organization must conduct a risk assessment to determine the appropriate retention period for each type of record. Retention decision makers must be aware that the presence or absence of records can be either helpful or harmful to the organization. Therefore, to minimize risks and costs associated with records retention, it is essential to immediately dispose of records after their retention period expires.

GARP ® Principle: Retention	Retention: An organization shall maintain its records and information for an appropriate time, taking into account legal, regulatory, fiscal, operational, and historical requirements.
Level 1 (Sub-Standard)	There is no current documented records retention schedule. Rules and regulations that should define retention are not identified or centralized. Retention guidelines are haphazard at best. In the absence of retention schedules, employees either keep everything or dispose of records based on their own business needs, rather than organizational needs
Level 2 (In Development)	A retention schedule is available, but does not encompass all records, did not go through official review, and is not well known around the organization. The retention schedule is not regularly updated or maintained. Education and training about the retention policies are not available.
Level 3 (Essential)	A formal retention schedule that is tied to rules and regulations is consistently applied throughout the organization. The organization's employees are knowledgeable about the retention schedule and they understand their personal responsibilities for records retention. The organization has defined specific goals related to retention.
Level 4 (Proactive)	Employees understand how to classify records appropriately. Retention training is in place. Retention schedules are reviewed on a regular basis, and there is a process to adjust retention schedules as needed. Records retention is a major corporate concern.
Level 5 (Transformational)	Retention is an important item at the senior management and board levels. Retention is looked at holistically and is applied to all information in an organization, not just to official records. The organization's stated goals related to retention have been met. Information is consistently retained for appropriate periods of time.

Principle of Protection[240]

A record-keeping program shall be constructed to ensure a reasonable level of protection to records and information that are private, confidential, privileged, secret, or essential to business continuity.

Information generated by an organization in the course of business requires various degrees of protection. Such protection is mandated by laws, regulations, or corporate governance, and it is necessary to ensure that information critical to an organization's continued operation during or after a crisis is available.

A record-keeping program must ensure that appropriate protection controls are applied to information from the moment it is created to the moment it undergoes final disposition. Therefore, every system that generates, stores, and uses information should be examined with the protection principle in mind .to ensure that appropriate controls are applied to such systems.

Information protection takes multiple forms. First, each system utilized must have an appropriate security structure so only personnel with the appropriate level of security or clearance can gain access to the information. This includes electronic systems as well as physical systems, using such measures as key card access restrictions and locked cabinets. This also requires that as personnel change jobs, their access controls are changed appropriately and immediately. Second, this requires protecting information from "leaking" outside the organization. Again, this may take various forms – from preventing the physical files from leaving the premises by various mechanical and electronic means to ensuring that electronic information cannot be e-mailed, downloaded, or otherwise proliferated by people with legitimate access to the system. Sometimes, this information should not even be sent by e-mail – even among parties who have access to it – because such an exchange can jeopardize its security.

An organization must also safeguard its sensitive records from becoming available on social networking sites and chat rooms by employees who may either inadvertently or maliciously post it there. It is prudent to have such safeguards clearly defined in organizational policy and, if necessary, to monitor sites for any postings that may violate this rule. Where appropriate, controls and procedures for declassification of confidential and privileged information should be clearly defined and understood. There may be instances, however, when it may be necessary to allow security clearance exceptions. For example, outside counsel engaged to assist with a litigation action may need to access records that they otherwise would not be cleared to access.

Security and confidentiality must be integral parts of the final disposition processing of the information. Whether the final disposition is an accession to an archive, transfer to another organization, or preservation for permanent storage or destruction, the procedures must consider the principle of protection in defining the process. For example, confidential employee paper files should be handled for disposition only by employees with appropriate clearance and must be shredded or otherwise destroyed in an unrecoverable manner. Classified government records

[240] http://www.arma.org/garp/protection.cfm

must retain their classification for the appropriate number of years even if they are transferred to an archive. Finally, an organization's audit program must have a clear process to ascertain whether sensitive information is being handled in accordance with the outlined policies in the principle of protection.

GARP ® Principle: Protection	Protection: A record-keeping program shall be constructed to ensure a reasonable level of protection to records and information that are private, confidential, privileged, secret, or essential to business continuity.
Level 1 (Sub-Standard)	No consideration is given to record privacy. Records are stored haphazardly, with protection taken by various groups and departments with no centralized access controls. Access controls, if any, are assigned by the author.
Level 2 (In Development)	Some protection of records is exercised. There is a written policy for records that require a level of protection (e.g., personnel records). However, the policy does not give clear and definitive guidelines for all records in all media types. Guidance for employees is not universal or uniform. Employee training is not formalized. The policy does not address how to exchange these records between employees. Access controls are still implemented by individual record owners.
Level 3 (Essential)	The organization has a formal written policy for protecting records and centralized access controls. Confidentiality and privacy are well defined. The importance of chain of custody is defined, when appropriate. Training for employees is available. Records and information audits are only conducted in regulated areas of the business. Audits in other areas may be conducted, but are left to the discretion of each function area. The organization has defined specific goals related to record protection.
Level 4 (Proactive)	The organization has implemented systems that provide for the protection of the information. Employee training is formalized and well documented. Auditing of compliance and protection is conducted on a regular basis.
Level 5 (Transformational)	Executives and/or senior management and the board place great value in the protection of information. Audit information is regularly examined and continuous improvement is undertaken. The organization's stated goals related to record protection have been met. Inappropriate or inadvertent information disclosure or loss incidents are rare.

Principle of Disposition[241]

An organization shall provide secure and appropriate disposition for records that are no longer required to be maintained by applicable laws and the organization's policies.

At the completion of the retention period for an organization's records, the records must be designated for disposition. In many cases, the disposition for records will be destruction. In other cases, the records may be returned to clients, transferred to another organization in connection with a divestiture, or transferred for on-going preservation to an historical archives, library, or museum. In all instances, the organization must make a reasonable effort to ensure that all versions and copies of the records are included in the disposition. The organization must also document its disposition process. If records are converted or migrated to new media, disposition of the previous media may also be warranted.

Disposition of relevant records must be suspended in the event of pending or on-going litigation or audit. The organization should designate records that are to be held pending resolution of the litigation or audit and notify all affected personnel when the hold is issued and when the hold is released.

Destruction of records must be performed in a secure manner, ensuring that records to be destroyed are transported securely and destroyed completely. The organization may choose to utilize "green" methods of destruction, but destruction must always be performed in a manner that renders the records completely and irreversibly destroyed.

The transfer of records to the custody of a historical archives, library, or museum should be documented as part of the organization's records retention policy. In general, disposition of records in this manner should be governed by appraisal of the records by a qualified professional. The appraisal should be based upon the historical or intrinsic value of the records. In some instances, the organization's records retention policy will designate which records are to be disposed of in this manner.

[241] http://www.arma.org/garp/disposition.cfm

GARP ® Principle: Disposition	Disposition: An organization shall provide secure and appropriate disposition for records that are no longer required to be maintained by applicable laws and the organization's policies.
Level 1 (Sub-Standard)	There is no documentation of the processes, if any, that are used to guide the transfer or disposition of records. The process for suspending disposition in the event of investigation or litigation is non-existent or is inconsistent across the organization.
Level 2 (In Development)	Preliminary guidelines for disposition are established. There is a realization of the importance of suspending disposition in a consistent manner, repeatable by certain legal groupings. There may or may not be enforcement and auditing of disposition.
Level 3 (Essential)	Official procedures for records disposition and transfer are developed. Official policy and procedures for suspending disposition have been developed. Although policies and procedures exist, they are not standardized across the organization. Individual departments have devised alternative procedures to suit their particular business needs. The organization has defined specific goals related to disposition.
Level 4 (Proactive)	Disposition procedures are understood by all and are consistently applied across the enterprise. The process for suspending disposition due to legal holds is defined, understood, and used consistently across the organization. Electronic information is expunged, not just deleted, in accordance with retention policies.
Level 5 (Transformational)	The disposition process covers all records and information in all media. Disposition is assisted by technology and is integrated into all applications, data warehouses, and repositories. Disposition processes are consistently applied and effective. Processes for disposition are regularly evaluated and improved. The organization's stated goals related to disposition have been met.

8.5. Appendix 5: PG&E's MAOP Project

While CPUC Commissioner Florio's Scoping Memo of November 21, 2011[242] designates that the first phase of this proceeding will address past record-keeping practices (i.e. it differentiates between past and future record-keeping practices) it was necessary to understand what document consolidation work had been undertaken as part of PG&E's forward-looking MAOP validation effort, in order to ascertain where documents were stored at the time of the incident. Gas transmission documents gathered during Phase 1 and Phase 2 of the MAOP Verification and Validation project consolidation process (the "MAOP Project"), included documents associated with Class 3 and 4 and Class 1 and 2 HCA segments (collectively, "HCA Segments"). Different document collection activities have occurred during the three phases of the MAOP Project. In each phase, the consolidation and scanning procedures were tailored to meet the needs of each effort. A fuller account of the activities for each of the three phases, is presented below.

MAOP Phase 1: In Phase 1, PG&E sought to verify pressure test documentation for the HCA Segments. To complete the verification, PG&E extracted from its Geographic Information System a list of all jobs associated with the HCA Segments. It then collected the physical records in the files (including folders) for those jobs and centralized them at the Emeryville facility. Phase 1 concluded March 15, 2011. It required a massive and unprecedented undertaking to meet the CPUC-imposed deadline. In this phase PG&E identified and gathered folders for all of the job numbers that GIS and the Transmission Plat Sheets associated with gas transmission pipelines running through the HCA Segments. PG&E consolidated the folders for processing and scanning because:

- There were many documents to review in a short amount of time.
- Under the time constraints of Phase 1, PG&E had to focus engineering resources.
- PG&E wanted the records to be in a location where they could be readily accessed by engineers conducting the MAOP validation and by field operators if necessary.
- PG&E moved the records to Emeryville when its Walnut Creek facility no longer had sufficient capacity to accommodate records storage and processing.

In addition, after collecting job folders from field offices, PG&E searched its storage facilities at Bayshore Boulevard and Beale Street for relevant documents. PG&E processed records from the Bayshore facility at the Cow Palace; it scanned relevant documents on-site and then sent all boxes containing relevant documents off-site for full-box scanning. PG&E followed a similar procedure at Beale Street, scanning all relevant documents onsite and sending all boxes with relevant documents off-site for full-box scans. After the full-box scans were completed for the

[242] I.11-02-016, "Order Instituting Investigation on the Commission's Own Motion into the Operations and Practices of Pacific Gas and Electric Company with Respect to Facilities Records for its Natural Gas Transmission System Pipelines", Assigned Commissioner's Scoping Memo and Ruling, November 21, 2011.

Bayshore and Beale Street boxes, those boxes were transferred to Emeryville. The target-scanning process was initially used because of time constraints in Phase 1.

MAOP Phase 2: In Phase 2, PG&E validated the MAOP of the HCA Segments of pipeline by analyzing the pipeline and pipeline attributes and features (e.g., valves, fittings, etc.) identified in the documents collected in Phase 1 to create a pipeline features list ("PFL"). Such documents include, but are not limited to as-built construction drawings, pipeline plan and profile drawings, bills of materials, material requisitions and specifications, A-forms, and pressure test records. PG&E is using the PFL to calculate the MAOP for each HCA pipeline segment. PG&E expects to complete its MAOP review for the HCA Segments by January 31, 2012.

For Phase 2, PG&E engineers reviewed both transmission and distribution plat maps of the HCA Segments. If the engineers identified potentially useful documents on the plat maps but could not find those documents in ECTS, the engineers submitted a request to a support team. The support team identified the job related to the requested documents and then provided the job number to a retrieval group. A retrieval group searched for the document in Emeryville. If the document was not in Emeryville, the retrieval group sent a team to locate the document at the appropriate field office location. The team then scanned an electronic copy on site and provided it to the engineers. The physical document remained at the field location. PG&E developed this procedure because:

- Phase 2 was a targeted collection effort.
- The records sought were known and identified specifically in advance.
- Phase 2 was not conducted under the time constraints of Phase 1.

In Phase 2, PG&E field-scanned 8,630 job files consisting of 93,000 pages of documents. PG&E did not catalog the folders scanned in the field offices or add them include them in the Emeryville database. They are, however, reported in ECTS.

MAOP Phase 3: In Phase 3, PG&E is expanding upon the work undertaken in the first two phases and extending it to PG&E's entire transmission system. It is anticipated the MAOP validation work will be completed in early 2013. For Phase 3, PG&E plans to conduct a centralized scan in Emeryville. Phase 3, like Phase 1, will require scanning a large number of documents. Scanning at a centralized location will be quicker and logistically more manageable than conducting on-site scans. The documents will be retained in a centralized location. To maintain greater governance and control over the documents, division offices will be provided with access to electronic versions. By December 19, 2011, PG&E had completed document collection for about 20% of the Phase 3 pipeline mileage. During Phase 1, the relevant hard copy documentation was ultimately centralized at Emeryville. During Phase 2, the more limited scanning occurred mostly at district and division offices; hard copy documentation was kept as filed on-site. Ultimately, all transmission related documents will be centralized as part of Phase 3 including those job folders that were part of Phase 2.

8.6. Appendix 6: Glossary and Definitions

Access: Right, opportunity, means of finding, using, or retrieving information

Attribute: Information held about the document such as title, subject, author, project reference, effective date

Author: The person who creates a document (or who captures and external document for use within the Company)

Classification: Systematic identification and arrangement of business activities and/or records into categories according to logically structured conventions, methods, and procedural rules represented in a classification system

Control: A situation where circulation is restricted to nominated personnel

Conversion: Process of changing records from one medium to another or from one format to another

Current: Live, active documents still in day-to-day use

Destruction: The process of eliminating or deleting records, beyond any possible reconstruction

Disposition: Range of processes associated with implementing records retention, destruction or transfer decisions which are documented in disposition authorities or other instruments

Document : Information recorded in a manner intelligible to the senses or capable of being made intelligible by use of equipment (or software) (e.g. a unit of meaningful text, graphic or numerical data that can be understood by reading, or accessed via basic pc tools such as MS-Office or Adobe Acrobat).

Document Management: The on and offsite management of internally and externally created documents and related materials (which may include company records)

Document Control: The management, circulation, approval and control of internally and externally created documents (typically engineering related, but could be applied to other document types and company records).

Document Controller: A person responsible for receipt and distribution of controlled documents

Electronic Document Management System (EDMS): An EDMS not only contains information about individual documents, but also contains a controlled version of the document (in its native and/or publication/distribution format). An EDMS is used to control access to documents and can provide a complete audit trial of the documents development history through version/revision.

FAQ: Frequently asked question

Folder: The physical storage container for a collection of one or more documents

Generally Accepted Record-keeping Principles® (GARP): A series of eight fundamental principles defined by ARMA International <insert reference here> (Accountability; Compliance; Transparency; Availability; Integrity; Retention; Protection and Disposition) that can be used to measure records management maturity.

Index: An alphabetic or systematic listing of subjects that refers to the relevance of the subject to a document or collection of documents

Indexing: The act of describing or identifying a document in terms of its subject content (to support filing and retrieval)

Information Management: The term applied to the management and control of both physical and digital information resources (documents, data, records and knowledge).

Information Governance: The process which ensures that the organization manages information according to sets of rules, guidelines, standards, policies that comply with relevant local and international legislation and regulations; assesses and manages risk; ensures that privacy and confidentiality standards are followed; and ensures that staff are aware of, and comply with, their information management responsibilities.

Integrity: Concerned with ensuring that the information was captured correctly and has not been subject to unauthorized change, whether accidental or deliberate

Inactive: Documents that are not in day to day use (i.e. Non-current) but are required to be retained for future reference (see semi-current and current)

Metadata: Data describing context, content and structure of records and their management through time

Migration: Process of moving records from one system to another, while maintaining the records' authenticity, integrity, reliability and usability

Process: A group of one or more activities that receive input (information, item etc.) and transform it into something more valuable

Preservation: Processes and operations involved in ensuring the technical and intellectual survival of authentic records through time

Record: Information created, received, and maintained as evidence and information by an agency, organization, or person, in pursuance of legal obligations or in the transaction of business (as defined in ISO 15489). A specific version of a document that is 'frozen' and preserves evidence of a specific event or activity (e.g. a signed letter).

Records: Any information in any media or format, created, received, or maintained as evidence or for information by the company (and its employees) in pursuance of its legal obligations or business transactions (ISO15489).

Records Center: A high-density storage facility that enables current and semi-current records to be retained in a cost-effective manner.

Records Management: The field of management responsible for the efficient and systematic control of the creation, receipt, maintenance, use and disposition of records, including processes for capturing and maintaining evidence of and information about business activities and transactions in the form of records

Records system: Information system which captures, manages and provides access to records through time

Registration: Act of giving a record a unique identifier on its entry into a system

Retention Schedule: Defines the period of time, media and reason records need to be retained in order to ensure that operational, statutory, audit and historical requirements are satisfied

Semi-current: Documents that still need to be referred to but only occasionally

Taxonomy: A way of ordering or arranging a body of unstructured information so that we can make sense of it and find individual items in it.

Tracking: Creating, capturing and maintaining information about the movement and use of records

Transfer: <movement> moving records from one location to another

Validation: Lists of approved values available to hold against an attribute

Vital records: A 'Vital' record is one which if lost or found to be incomplete would make it very difficult for a company to continue operating until it was created, Records that in the event of a disaster are essential to maintain business continuity.

8.7. Appendix 7: The Evolution of PG&E's Records Retention Standard Practice and a Comparison with Industry Standards and Regulations

8.7.1. Standards and Guidelines specific to engineering, and, pipeline safety containing record-keeping requirements

This records management review included standards that while not directly categorized as general records keeping standards, are directly relevant to PG&E gas safety and gas safety record-keeping. We screened various standards and regulations from 1950s to 2010 including ASA B31.1 – Power Piping, Title 49 CFR part 192 Transportation; Title 18 CFR part 125 Conservation of Power and Water Resources and CPUC Resolutions FA570 and A4691.

Engineering Standard ASA B31-1935 Code for Pressure Piping has evolved through a number of revisions up to the present day. This standard contains, within its technical detail, information on how long to retain specific records. For the purpose of this report we have cited B31.1.8-1955 Section 8 of American Standard Code for Pressure Piping Gas Transmission and Distribution Piping Systems Section 851.5 as an example. 851.5 states "Pipeline Leak Records. Records should be made covering all leaks discovered and repairs made. All pipeline breaks should be reported in detail. These records along with leakage survey records, line patrol records and other records relating to routine or unusual inspections should be kept in the file of the operating company involved, as long as the section of line involved remains in service."

The Code of Federal Regulations sets utility requirements for gas transportation safety. 49 CFR part 192 requires maintenance of certain gas related records and record-keeping throughout its sub-parts. For example both sub part M – Maintenance 192.709 – Transmission Lines: Record Keeping and subpart N Qualification of Pipeline Personnel 192.807 – Record Keeping, give a retention period for the disposition of the records relating to specific items. We have also reviewed subpart O Gas Transmission Pipeline Integrity Management 192.917 - How does an operator identify potential threats to pipeline integrity and use the threat identification in its integrity management program? Subsection 4 Human Error (b) data gathering and integration. This paragraph cross refers to engineering standard B31.8S and states "At a minimum an operator must gather and evaluate the set of data specified in Appendix A to ASME/ANSI B31.8S, and consider both on the covered segment and similar non-covered segments, past incident history, corrosion control records, continuing surveillance records, patrolling records, records maintenance history, internal inspection records and all other conditions specific to each pipeline." This shows clearly, legal requirement, and the need for gas utilities to maintain and retain records that are complete and can be accessed when required and at a pipeline level. This part has been in effect since 2004.

8.7.2. Evolution of PG&E's Records Retention Standard Practice

The 1950s and 60s

On 17 May 1951 PG&E issued a circular letter EX #642[243] updating a 1938 letter from a Mr. Downing relating to the Federal Power Commission's Regulation to govern the preservation of records of public utilities and licensees, effective August 1938, with amendments to January 1, 1951 which stated that the supervision of the preservation and indexing of records was the responsibility of General office and department heads and division managers. Furthermore that they were responsible also for the authorization of the destruction of records and that authorization to destroy must be secured in writing from the general office department head concerned. The circular showed the classes of records identified within the regulations and detailed the categories under which each record class, by location, must be indexed. While it did not list the records to be preserved in detail it provided examples.

In March 1959 PG&E issued standard practice No. 210.4-3[244] relating to retention of records - general office departments but not referring to the earlier circular letter EX#642. This document did not state that it superseded the earlier 1938 (1951 revised) letter. While EX#642was entitled "Retention of Records – General Office Departments" its purpose was not to provide a policy on retaining records but to provide a policy on the destruction of General Office Records[245] . It instructed each department to "issue its own retention schedule" and cross referenced to "4. FPC Number" which referred to a "comparable record number in the Federal Power Commission's 'blue book' entitled "Regulations to Govern the preservation of Records of Public Utilities and Licensees" as identified in the earlier EX#642 circular letter of 17 May 1951. The list of records appended with FPC numbers did not include any specific engineering records such as drawings or specifications. However, the continuing reference to the Federal Power Commission's Regulations showed that PG&E was aware of the explicit details in the regulations that related to the preservation of records of public utilities and licensees.

In August 1959 "Standard Practice 210.4-4[246] Retention of Records – Divisions", that related to the destruction of division records held locally but not division records on file in general office departments, was issued. It was similar to 210.4-3 but this document stated that it superseded VP and GM Circular Letter #642 and any previous instructions concerning the retention of Division Records except for standard practice 210.4-1. Whereas in 1951 circular EX#642 the responsibility for the compliance with the FPC regulations was clearly placed on the shoulders of the General office department heads and division managers by 1959 this responsibility was removed and no further reference was made regarding authority at a senior level. An attached

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[243] P2-191(Chapter 2 and 2A Attachments) PG&E Circular Letter Ex642: Federal Power Regulations to Govern the Preservation of Records (05/17/1951)

[244] P2-192 (Chapter 2 and 2A Attachments) PG&E SP 210.4-3 Retention of Records General Office Departments (03/01/1959)

[245] Records Disposal Act 1943 (44 U.S.C. Chapter 33); & referencing the "Federal Records Act of 1950" as (44 U.S.C. Chapters 21, 25, 29, & 31)

[246] P2-193 (Chapter 2 and 2A Attachments) PG&E SP 210.4-4 Retention of Records Divisions (08/01/1959)

records retention schedule was referred to, but not provided by PG&E here, a later one dated September 1964[247] is provided. Standard Practice 201-4.3[248] was updated and re-issued in March 1961 and included a reference to low cost storage, {shown in an attached map as PG&E Records Center on Bay shore Boulevard}, and the requirement for records, that must be retained for a period of time, being stored there. Procedures relating to the dispatch of these records were included in this document. The fact that these documents existed in the 1950s is a clear indicator that PG&E, at that time, was fully aware of the requirements to retain and dispose of records and that the Regulations from the Federal Power Commission were the authority that governed the retention and disposal and identified the different categories of records to be included under the standard practices mentioned here. The policy statements within the documents seem to have changed from preservation, indexing and authorized destruction in 1951[249] to destruction from 1959[250], despite the titles of the standard practice documents being "Retention of Records".

By 1968 standard practice 210.4-3[251] for general office departments had been in operation for nine years and was updated to reflect a more financial reason for storing inactive documents in low cost storage facilities with destruction of obsolete records still being cited as one of the purposes for the policy. The Federal Powers Commission had issued a new version of its "Regulation to Govern the Preservation of Records of Public Utilities and Licensees" in December 1962 and the CPUC had adopted it in August 1963. Section 4 of the PG&E 1968 standard practice 210.4-3 stated clearly that "Existing retention schedules should be revised in accordance with the FPC regulations and a copy sent to the Supervisor of Records". This shows that PG&E was now gathering data about how each general office department was retaining and disposing of their records and that inactive records were being stored centrally in a low cost storage center. Up to this point no changes to the instructions on indexing the records were given after the 1951 circular #642 was superseded in 1959 other than those relating to the completion of the transmittal forms for moving the cartons of documents to the low cost storage Center.

The 1970s

No further changes were issued to standard practice 210.4-3[252] until July 1976 when the Federal Power Commission's January 1972 "Regulations to Govern the Preservation of Records of Public Utilities and Licensees and Natural Gas Companies" were adopted by PG&E with certain exceptions as specified by CPUC Resolution FA570 (extract included in 210.4-3). Also in this update was the requirement in section 7 to make an inventory of the records being placed into

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[247] P2-195 (Chapter 2 and 2A Attachments) PG&E Retention Schedule for Records in the Divisions (09/01/1964)

[248] P2-194 (Chapter 2 and 2A Attachments) PG&E SP 210.4-3 Retention of Records General Office Departments (03/01/1961)

[249] P2-191 (Chapter 2 and 2A Attachments) PG&E Circular Letter Ex642: Federal Power Regulations to Govern the Preservation of Records (05/17/1951)

[250] P2-192 "To destroy all General Office records which have outlived their usefulness to the Company from a legal operating and administrative standpoint"

[251] P2-196 (Chapter 2 and 2A Attachments) PG&E SP 210.4-3 Retention and Destruction of Records General Office Departments (07/01/1968)

[252] P2-199 (Chapter 2 and 2A Attachments) PG&E SP 210.4-3 Retention and Destruction of Records General Office Departments (11/01/1976)

storage in the PG&E Records Center. Section 7 implied that a master index of the documents being stored at the Records Center was compiled and kept in the records center but that departmental inventories may be needed in the event the "master index" was destroyed. Standard Practice 210.4-4[253] that related to Division records had not been updated since 1959 but was updated in August 1976 for the same reasons its sister, standard practice 210.4-3 for general office departments' records, had been updated a month earlier.

The main difference between the two standard practice documents was that where the general office departments were required to store inactive records in the record center, the divisions did not have that instruction included in their standard practice – division records remained in the divisions. Records Management Assistance was offered to all via the Corporate Secretary's Office by the Supervisor of Records.

In January 1977 a letter was sent to Company Officers and Department Heads from the Secretary's Office (J F Taylor – signatory) accompanying a revision to standard practice 210.4-3[254] emphasizing the revisions in the standard practice relating to the destruction of records and the process that must be followed and implemented immediately. This was a financially driven instruction due to the cost of retaining records and the fact that the records center was near capacity. Disposal of records was to be the key to a reduction in storage costs. The letter made it clear that the FPC regulation number was to be the governing rule for the disposal of the records and that each department was to be sent a list of records stored at the records center and that it was their responsibility to append the list with the appropriate FPC number against each record.

The Supervisor of Records was cited as the person to contact for details of the FPC regulations. The amendment to 210.4-3 1977 included as Appendix A, the CPUC additions to the FPC regulations, specified on resolutions FA570 August 3, 1976 (cross referenced to FA554) and A4691[255] the latter dated June 12 1977. Included in these additions was a section called "Operations and Maintenance" containing sections "18 - Production records of sources of supply, pumping, transmission, and distribution; 19 - Personnel records including employees' benefit and pension records, and operating and procedural instructions issued by company to employees; and, 20 - Plant and depreciation records, including plant inventory, drilling appraisals, engineering records, construction records and contracts relating to the above. Under each section a list of types of records was shown with retention periods appended. Only equipment repair records under section 18 demanded that records were kept for "life of equipment" with section 20 retention period being 50 years. Bearing in mind that this standard practice amendment for 210.4-3 related to general office departments and not the divisions (210.4-4) it is debatable whether or not the engineers (divisions) would have disposed of their

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[253] P2-200 (Chapter 2 and 2A Attachments) PG&E SP 210.4-4 Retention and Destruction of Records Divisions (11/01/1976)

[254] P-201 (Chapter 2 and 2A Attachments) PG&E Memorandum re new standard practice 210.4- 3 Retention of Records (01/03/1977)

[255] A4691 refers to Water Utilities and although quoted in PG&E standard practices documents does not appear to be relevant to gas safety records

operations and maintenance records after 50 years. However, the reason for this amendment was primarily to encourage disposal of records in accordance with the departmental retention schedules and in line with FPC Regulations and CPUC additions so some engineering records may have been disposed of at this time. In 1977, the FEA, ERDA, the Federal Power Commission, and a number of other energy program responsibilities were merged into the Department of Energy (DOE) and the independent Federal Energy Regulatory Commission (FERC). The PG&E standard practices documents continue to reference FPC as the governing source for regulations with FERC being referenced occasionally.

The 1980s

No further revisions to Standard Practice 210.4-3 General Office Departments were reported until November 1985. However, no copy of this revision was made available via the Data Request responses. Standard Practice 210.4-4 relating to Divisions had not been revised since August 1977 until both standards were revised and re-issued in June 1986. These revisions redrafted a section on responsibilities for "Department Heads (210.4-3) / Regional Managers or their Designees" (210.4-4). The standard practice 210.4-4 had re-titled the document "Retaining and Destroying Records – Operating Regions" replacing the word Divisions with Operating Regions. The documents had been revised to include a section on "Determination of Record Retention Periods" that referenced the FPC Regulations: Docket No R-429, Order No 45 – January 1972; Part 125 –Preservation of Records of Public Utilities and Licensees – October 1983; Part 225 – Preservation of Records of Natural Gas Companies – October 1983; 10 CFR 50 relating to Nuclear Power Plant QA records; CPUC Resolutions FA570 August 1976 and A4691 July 1977; and, as a 'catchall' a statement that read "Other legal requirements as issued periodically in advisory notices from the Law Department". The lists were identical across both standard practice documents and included as Supplements A, B and C copies of the text from the FPC Regulations and CPUC resolutions. The only difference, as in previous revisions between the 2 standard practices was the necessity for the general office departments to use the Records Center to store inactive records.

In June 1989 a statement of policy on Corporate Records[256] was issued identifying, as the responsibility of the Corporate Secretary, the issuing, updating and monitoring compliance with the retention policy. The document included as references (without dates or revision numbers) "Standard Practices 210.4-2 Correspondence and Records of PG&E Subsidiary Companies; 210.4-3 Retaining and Destroying Records – General Office Departments; and, 210.4-4 Retaining and Destroying Records – Operating Regions". This policy statement continued to segregate general office department records (now called corporate records) where originals had to be transferred to the Corporate Secretary or be retained locally as the corporate secretary determined with those in the regions (regional records). As with most previous standard practices there is no indication of who received a copy of these documents or details of how any monitoring took place.

[256] P2-206 (Chapter 2 and 2A Attachments) PG&E Corporate Records – Statement of Policy (06/13/1989)

The 1990s

210.4-1 "Preservation of Accounting Records"[257] issued in October 1977 and revised in July 1991 contained cross references to 210.4-3 and 210.4-4. While focusing only on accounting records the format and instruction within the standard practice closely resembled that of the other two standard practices showing a consistency across these types of policy documents. It referenced also the same FPC Regulation to Govern the Preservation of Records of Public Utilities and Licensees revised April 1987 and Regulations to govern the Preservation of Records of Natural Gas Companies also dated April 1987.

Standard Practice 210.4-2 "Correspondence and Records of PG&E Subsidiaries"[258] issued in June 1986 and revised in 1993 contains instructions on the management of those records that were 'inherited' from subsidiary companies. However, the records referenced do not include any engineering records and appear to be limited to the administration and accounting of the subsidiaries rather than the operational work.

Standard Practice 210.4-4[259] "Retaining and destroying records – Operating Regions" updated January 1993 made a change to the position of the people accountable for specific actions in governing the records retention processes. The Regional Vice Presidents or their designees were now shown. The 1987 FERC 125.2 (5b) attached to the document stated that "Each public utility or licensee subject to the regulations in this part shall designate one or more persons with official responsibility to supervise the utility's or licensee's program for preservation and authorized destruction of its records". PG&E had identified who their responsible parties were since the 1970s when this requirement was established. For the first time details of transfer of operating regions' records to Records Storage Facilities was included in the standard practices 210.4-4 series for operating regions. The details from the ad hoc memorandum that had been sent out in June 1989[260] were not included.

PG&E Standard Practice 210.4-3[261] updated April 1994 encompasses 210.4-1 (Accounting Records); 210.4-2 (PG&E Subsidiaries Records); 210.4-4 (Operating Regions Records) and 210.4-5 (Vital Records) Its new title was "Retaining and Destroying Records – All PG&E Departments and Subsidiaries". It referenced all the same regulations and resolutions as on the previous version and itemized accounting; environmental; nuclear; subsidiary company and vital records with specific additional instructions. Accompanying the revised 210.4-3 was a "Guide to Retention of Company Documents",[262] a 56 page retention schedule listing specific types of

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[257] P2-208 (Chapter 2 and 2A Attachments) PG&E SP 210.4-1 Preservation of Accounting Records (07/01/1991)

[258] P2-209 (Chapter 2 and 2A Attachments) PG&E SP 210.4-2 Correspondence and Records of PG&E Subsidiary Companies (01/02/1993)

[259] P2-210 (Chapter 2 and 2A Attachments) SP 210.4-4 Retaining and Destroying Records – Operating Regions (01/02/1993)

[260] P2-206 (Chapter 2 and 2A Attachments) PG&E Corporate Records – Statement of Policy (06/13/1989)

[261] P2-211 (Chapter 2 and 2A Attachments) PG&E SP 210.4-3 Retaining and Destroying Records – All PG&E Departments and Subsidiaries (04/01/1994)

[262] P2-212 (Chapter 2 and 2A Attachments) PG&E Guide to Retention of Company Documents (04/06/1994)

records with a retention period assigned and the regulatory reference that governed the retention of the records. Section 5 related to Transmission and Distribution and Section 7 related to Gas Supply. As built records of facilities, for example, showed they were governed by FERC 36A and retained for "life of the facility"; leak or test failure reports also showed "Life of facility" as the retention period. It would appear that a memorandum was sent from the Corporate Secretary on April 6 1994[263], with the revised standard practice, to "Various" explaining the merging of the 210.4 series of standard practices into one and explaining that the Company Record Center was "quickly approaching its limit". So for the second time in 17 years the company was being asked to review its records for disposal and to control the company's cost for retaining inactive records as well as follow the Company's retention policy.

In May 1996 PG&E issued a Corporate Records Policy Statement – E3.4-1[264] followed, in July 1996, by a new Records Retention document replacing 210.4-3, and numbered CSP4.[265] CSP4 was considerably different to the 210.4 series of practices as it no longer contained specific details on regulations and records types, these were referenced collectively as a basic guide to be obtained from the Records Center. CSP4 was, in essence, an FAQ[266] styled document that asked rhetorical questions and provided summary answers. In October 1998 CSP4 became USP4 and was updated with information relating to electronic media. It retained the same question and answer format but the specific references to FERC regulations and CPUC resolutions guidance had gone and been replaced with reference to documents on Federal and State Retention Guidelines. The 1994 Guide to Record Retention remained as the source to use for identifying records to retain including the title of the governing regulations. This source was available from the Records Center or online on the "Record Retention Intranet Website". It would appear that this Guide was updated by section as items changed within it and specific sections were revised and issued as separate amendments from around the end of the 1990s.

The 2000s

Since the introduction of PG&E's CSP4 in 1996 the standard practices documents had been re-issued on a two yearly cycle. This continued in the 2000s with revisions being issued in the month of October in 2000; 2002; 2004; 2006; 2008 and in October 2010 immediately after the San Bruno Pipeline Rupture and Fire. The format and numbering system changed in 2010 and USP4 became GOV-70001S Record Retention and Disposal Standard. The Guide to Retention continued to be updated on an ad hoc basis and re-issued piecemeal by section.

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[263] P2-213 (Chapter 2 and 2A Attachments) PG&E Memorandum Re. Records retention, revision of standard practice 210.4-3 (04/06/1994)

[264] P2-214 (Chapter 2 and 2A Attachments) PG&E Corporate Records Policy Statement (05/01/1996)

[265] P2-215 (Chapter 2 and 2A Attachments) PG&E CSP4: Corporate Standard Practice 4 Record Retention (07/01/1996)

[266] FAQ – frequently asked questions

8.8. Appendix 8: The Consultants

Dr Paul R. Duller, MBA, FGS, C.Geol, C.Sci, AMIRMS

Paul is the Information Management Consultancy Director for the UK-based Tribal Group plc (Tribal). He is an international records management specialist, a geologist and a chartered scientist with a PhD in geology and data management and an MBA in Business Administration. Paul is Chairman of the Data Management Group for the Petroleum Exploration Society of Great Britain, Chairman of the Geoscience Information Group of the Geological Society, and Director and Previous Past Chairman of the UK Information & Records Management Society. He is the author of a number of papers and technical reports and has considerable experience of records management practices in the oil and gas sector, the project management of large-scale records management projects (both physical and electronic records) and the development and implementation of records management policies, strategies and retention schedules. Paul has been an editor of the UK Information & Records Management Society's journal for the last 10 years, and is an Honorary Teaching Fellow in Archives and Records Management at the University of Dundee.

Paul has held senior information management positions in two major oil and gas companies, two major oil and gas consultancy groups and the Ministry of Petroleum and Minerals in the Sultanate of Oman. For the last 12 years has led an information and records management consultancy practice on behalf of the Tribal Group plc.

Paul was selected as a consultant to undertake this review by CPUC as he has over 25 years' experience in data, document and records management within the oil and gas sector. He has conducted international information management reviews and/or provided records management training for 60 oil sector clients in Algeria, Bahrain, Bolivia, Borneo, Brazil, Bangladesh, Canada, India, Indonesia, Norway, Denmark, Germany, Jersey, Saudi Arabia, South Africa, Malaysia, Thailand, Trinidad, Tunisia, UK and the USA.

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Alison North

Alison is a successful entrepreneur having founded and managed her own records management consultancy company in 1986. She is recognized as an author and educator in information and records management and was one of the first Records Managers appointed in the UK, in 1972. Starting out in an era when women were not considered as equals she was the first female to work on a North Sea oil platform in the 1970s where she established an 'offshore information center' that held all drawings and records pertaining to the equipment on the platform. In developing a system that pre-dated personal computers and email she used microform to reduce the paper footprint ensuring a virtually paper-free environment in a limited space. Since then she has continued to introduce new ways of working to many organizations worldwide most recently designing and developing a unique interactive web-based database of legislation and regulations that delivers accurate records retention guidance via the 'cloud'. She has developed innovative records management programs and implemented information strategy in global and local organizations. Focused on simple, cost effective and efficient methods backed up by clear guidance and personal mentoring she leads the way in developing simple solutions for delivery and implementation at all levels within an organization.

A regular writer and speaker on information governance in the UK and abroad she has recently been elected to ARMA's Board as International Director responsible for delivery and implementation of their strategy and services outside of USA and Canada. She holds the Information and Records Management Society Lifetime Achievement Award and sponsors the annual Alison North New Professional Award as part of her commitment to encourage and assist new records management professionals in their work.

Alison was selected as a consultant to undertake this review for CPUC as she has 40 years' experience in records management, 14 years of which she spent in the oil and gas sector and in particular working with the engineers as an information specialist responsible for managing their records across many sites in many countries. She continues to deliver records management services worldwide in USA, Europe, Asia, and the Middle East.

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8.9. Appendix 9: Required Record Retention Schedules and Statutory Penalties

8.9.1. Introduction

This section features two tables (attached at the end of this section and referred to in the main body of the report as Appendix 9 Tables). The first is entitled "PG&E Retention Schedules Compared to ASME, Code of Federal Regulations, and General Order 112 Requirements". The second is entitled "Pressure Test Record Keeping and Operating Pressure Requirements". The ensuing passage prefaces the tables, and provides several points relating to them. Section II explains how to read the Appendix 9 Table entitled "Laws and Policies", including an explanation of some of the terms in the spreadsheet. Section III provides disclaimers about the Appendix 9 Tables. Finally, Section IV adds one additional underlying set of laws regarding statutory penalties for failure to comply with the constitution or any statute, which is shown to date at least as far back as 1915.

8.9.2. How to Read the Appendix 9 Table Entitled "PG&E Retention Schedules Compared to ASME, Code of Federal Regulations, and General Order 112 Requirements"

This passage explains several things about the Appendix 9 Table entitled "Laws and Policies" which may help with reading it.

What do the Headings in Row 1 Mean?

First, the column headings in row 1 provide the source document and effective date of a given PG&E retention schedule. For example, columns C and D in Row 1 contain the text, "(P2-195); Effective Date: 9/1/1964". This means that every PG&E retention period for the various types of records shown under that column comes from PG&E's source document P2-195, and became effective September 1st, 1964.

What do the Headings in Row 2 Mean?

The column headings in row 2 provide several things. Column A in Row 2 shows "Record type". This refers to a particular type of record. By looking at each record type under this column, one can see how PG&E's retention requirements compared with those of other sources of authority at different points in time. For example, the first heading under Column A is "As-built records of facilities", Rows 3 through 6. By examining the entries to the right of this entry one can compare at different points in time how long PG&E's internal requirement was to keep As-built records of gas facilities with similar requirements from the American Society of Mechanical Engineers ("ASME"), the Code of Federal Regulations ("CFR"), and various versions of General Order 112 ("GO 112"). Column B in Row 2 says "Source of Policies/Standards/Rules#". This provides the source of the rule establishing a recordkeeping retention period for each type of record. The different sources shown include PG&E, ASME, CFR, and the Commission's GO112. The term CFR here specifically refers to Title 49 of the

Code of Federal Regulations, Section 192. The specific portion of this Section of the CFR is provided in the "Reference" column.

Beginning with column C, these column headings provide the reference of each retention policy and the retention periods, or periods of time that a policy required a type of records to be kept. For example, row 2, column D contains the text "Retention Period". Because this column is under the 9/1/1964 all entries in this column show how long a given type of record had to be kept as of September 1st, 1964. Furthering this example, row 2, column C contains the text "Reference". Every entry in this column shows the reference where the retention policy shown in column D can be found. Therefore, each "Retention Period" and "Reference" heading fit together to provide a set of retention policies and the sources where they can be found.

In Column B, What Do the Dates Next to the ASME, CFR, and GO112 Entries Mean?

ASME, CFR, and GO112 had various dates in which a retention requirement became effective, which are shown here. These dates are set up to show the retention requirement in ASME, the CFR, or GO 112 that was effective at the same time PG&E had a policy in place. For example, on September 1, 1964, Row 55 Column D shows that PG&E had a requirement that Line Patrol Reports be kept in the office for a minimum of 1 year, and for 3 years total. In comparison, line 56 shows that each of the ASME standards in place dating from 1955, through September 1, 1964, and including the policy in 1975 required Line Patrol Records to be kept for the Life of the Facility. Similarly, General Orders 112, 112A, and 112B, effective in 1961, 1963 and 1967 respectively, each required Line Patrol Records to be kept for the Life of the Facility, because section 107 of these General Orders made the ASME standards identified in the spreadsheet mandatory.

An Explanation of Other Terminology

In several instances, PG&E uses the term "T" to describe the length of its internal retention schedule. The retention code "T" means "until terminated, superseded, closed, expired, canceled, redeemed, disposed of, surrendered, discharged, discontinued, retired, or until the record has served its purpose."[267]

8.9.3. Disclaimers about the Tables in Appendix 9

In order to ensure clarity on this matter, several disclaimers about the Tables in Appendix 9 are presented below:

Since 1911, PG&E Has Been Consistently Required To Maintain Each Record in the Appendix 9 Tables To Promote The Safety of Their Respective Patrons, Employees and The Public: The term "Source of Policies/Standards/Rules#" in Row 2 has hash mark "#". This

[267] See PG&E Data Response to CPSD Data Request 58.

provides for a footnote at the bottom of the page which provides the language from California Public Utilities Code Section 451, and its predecessor section of the California Public Utilities Act from 1911. This hash mark represents the point that for all records identified in both this spreadsheet and the ones regarding pressure records, CPSD maintains that from 1911 until the present, these laws have consistently required PG&E to maintain instrumentalities, equipment, and facilities, including records, to promote the safety of their respective patrons, employees and the public.

The Information in Appendix 9 Serves as Reference Material, But Is Not Sponsored by Any Particular Witness: The information presented in these spreadsheets refers to PG&E policies, industry standards and sources of law. As such, the Appendix 9 tables themselves may be referenced by CPSD's reports. However, the information in the spreadsheets is not sponsored by any witness.

The Appendix 9 Tables Do Not Necessarily Identify Every Record Retention Requirement That PG&E Must Follow: In providing the Appendix 9 Tables, CPSD has several intentions. First, the spreadsheets are intended to be an easy reference for Commission decision makers to compare retention requirements. Second, the spreadsheets serve as a source that is sometimes referenced by CPSD's recordkeeping reports. However, CPSD is aware there are other recordkeeping retention requirements that apply to PG&E and other similar companies. Some of these requirements relate, for example, to accounting purposes rather than safety related ones. So those kinds of requirements were not included in the spreadsheet.

PG&E Voluntarily Followed ASA Code Section B31.8 Beginning in 1955: This section provides context to the entries in the first Appendix 9 Table called ASME. These entries are seen in the second column of this table. These standards are the same as the various iterations of the ASA Code, which have been called Section B31.1.8 or B31.8 between 1935 and today. PG&E has acknowledged that it voluntarily follows the ASA Code Section B31.1.8 beginning in 1955. It states, "PG&E believes that, in 1956, its practice was to follow The ASA Code for gas transmission and distribution piping systems ("ASME standards")."[268] "To support this belief, PG&E points to the attached November 22, 1955 testimony before the California Public Utilities Commission, which indicates that PG&E adhered to ASA B31.1.8.."[269]

In 1960, the CPUC also observed that PG&E acknowledged following ASA Code Section B31.8 in 1958. In the decision adopting the first version of General Order 112, PG&E stated that it and the other gas utilities in California already voluntarily followed the 1958 version of the ASME standards. PG&E used this point to claim that GO 112 was unnecessary, and that it was unnecessary for GO 112 to make the ASME standards mandatory. In addition to claiming that it had already voluntarily followed the ASA Code, it emphasized that,

[268] PG&E Response to Data Request 15, Question 6.

[269] See PG&E Response to Data Request 15, Question 6, Attachment 3.

> "there is no evidence to show that public health or safety has suffered from the lack of a general order, that the safety record of California gas utilities has been excellent; that there have been no major pipeline failures in the State resulting in either loss of life or major interruption of service; that there is nothing to indicate this good record will not continue; and that the gas utilities in California voluntarily follow the American Standards Association (ASA) code for gas transmission and distribution piping systems."[270]

Nonetheless, General Order 112 required that gas transmission facilities be constructed and operated in compliance with the 1958 version of ASA B31.8.[271] All references to ASME identified in the Appendix 9 tables are the same sections of ASME as those identified in this passage, although some are references to later versions. Therefore, PG&E voluntarily follows these ASME standards as if it is bound by them.

California Law Has Established Penalties for Failure to Comply With the Constitution or Statute As Far Back as 1915: From 1993 to 2011, the California Public Utilities Code Section 2107 provided that, "Any public utility which violates or fails to comply with any provision of the Constitution of this state or of this part, or which fails or neglects to comply with any part or provision of any order, decision, decree, rule, direction, demand, or requirement of the commission, in a case in which a penalty has not otherwise been provided, is subject to a penalty of not less than five hundred dollars ($500), nor more than twenty thousand dollars ($20,000) for each offense."[272] As of January 1, 2012, the maximum penalty has been increased to $50,000 for each offense.[273] Each day in a continuing violation is a separate offense (Cal. Pub. Util. Code Section 2108), although the Commission has the right to compromise the penalties imposed under these provisions. (Cal. Pub. Util. Code Section 2104.5). Moreover, all penalties accruing shall be cumulative, and a suit for one penalty shall not be a bar to other penalties, or be a bar to any criminal prosecution of the public utility or any of its officers, directors, agents or employees, or of the exercise by the Commission of its power to punish for contempt.(Cal. Pub. Util. Code Section 2105).

From 1951 to July 25 1993, Cal. Pub. Util. Code Section 2107 provided that, "Any public utility which violates or fails to comply with any provision of the Constitution of this State or of this part, or which fails or neglects to comply with any part or provision of any order, decision, decree, rule, direction, demand, or requirement of the commission, in a case in which a penalty has not otherwise been provided, is subject to a penalty of not less than five hundred dollars

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[270] D.61269, p. 4.

[271] See General Order 112, §107.1

[272] Cal. Pub. Util. Code §2107; DEERING'S CALIFORNIA ADVANCE LEGISLATIVE SERVICE, Copyright © 1993 by Matthew Bender & Company, Inc.

[273] (Stats. 2011, c. 523 (S.B 879), § 2.)

($500) nor more than two thousand dollars ($2,000) for each offense.[274] The 1951 statute re-enacted a substantially similar provision of the Public Utilities Act, Section 76(a), enacted in 1915, which provided:

> "Any public utility which violates or fails to comply with any provision of constitution of this state or of this act, or which fails, * * * to obey * * * any order * * * of the commission, in a case in which a penalty has not hereinbefore been provided for such public utility, is subject to a penalty of not less than five hundred dollars nor more than two thousand dollars for each and every offense."[275]

A full set of the Appendix 9 tables is presented overleaf:

[274] (Stats. 1951, c. 764, p. 2098, § 2107.) West's Ann.Cal.Pub.Util.Code§ 2107.

[275] People v. Western Air Lines, Inc., 268 P.2d 723, 727.

		(P2-195); Effective Date: 9/1/1964		(P2-212); Effective Date: 4/6/1994		(P2-225); Effective Date: 3/14/2005		(P2-227); Effective Date: 5/22/2008		(P2-230) Effective Date: 4/16/2010	
Record Type	Source of Policies/Standards/Rules#	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period
As-Built Records of Facilities	PG&E	N/A	N/A	P2-212	Life of facility	P2-225	Life of facility	P2-227	Life of facility	P2-230 (E&O – GT&D – ESS)	Mandated Retention Period: Life of facility Recommended Disposal Period: Life of facility
	ASME										
	CFR (02/11/1994)	-		192.605(a) and (b)(3)	PG&E must have an Operations and Maintenance Manual that must include procedures for making construction records, maps, and operating history available to appropriate personnel.	192.605(a) and (b)(3)	PG&E must have an Operations and Maintenance Manual that must include procedures for making construction records, maps, and operating history available to appropriate personnel.	192.605(a) and (b)(3)	PG&E must have an Operations and Maintenance Manual that must include procedures for making construction records, maps, and operating history available to appropriate personnel.	192.605(a) and (b)(3)	PG&E must have an Operations and Maintenance Manual that must include procedures for making construction records, maps, and operating history available to appropriate personnel.
	GO112										
Drawings of Facilities	PG&E	N/A	N/A	P2-212 (Electric Supply: As-Built Records of Facilities)	Life of facility	P2-225 (Electric Supply: As-Built Records of Facilities)	Life of facility			P2-230 (Electric Maintenance and Construction: As Built Records/Drawings of Facilities)	Mandated Retention Period: Life of facility or 6 years after facility is retired Recommended Disposal Period: Life of equip/facility
	ASME										
	CFR (02/11/1994)			192.605(a) and (b)(3)	PG&E must have an Operations and Maintenance Manual that must include procedures for making construction records, maps, and operating history available to appropriate personnel.	192.605(a) and (b)(3)	PG&E must have an Operations and Maintenance Manual that must include procedures for making construction records, maps, and operating history available to appropriate personnel.	192.605(a) and (b)(3)	PG&E must have an Operations and Maintenance Manual that must include procedures for making construction records, maps, and operating history available to appropriate personnel.	192.605(a) and (b)(3)	PG&E must have an Operations and Maintenance Manual that must include procedures for making construction records, maps, and operating history available to appropriate personnel.
	GO112										
Metallurgical Failure Analysis	PG&E	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	P2-230	Mandated Retention Period: None Recommended Disposal Period: Kept permanent
Leak Survey Maps	PG&E	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	P2-230	Mandated Retention Period: 9 years - Recommended Disposal Period: 10 years
	ASME (1955, 1958, 1963, 1967, 1968, 1975)	851.5	LoF.								
	ASME (1986, 1989, 1995, 1999)			851.6	LoF	851.6	LoF				
	ASME (2007)							851.6	LoF		
	ASME (2010)									851.6	LoF
	CFR (08/19/1970)			192.709	LoF						
	CFR (06/06/1996)			192.706 and 192.709	Either 5 years or until the next leak survey record is made, whichever is greater.	192.706 and 192.709	Either 5 years or until the next leak survey record is made, whichever is greater.	192.706 and 192.709	Either 5 years or until the next leak survey record is made, whichever is greater.	192.706 and 192.709	Either 5 years or until the next leak survey record is made, whichever is greater.
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	LoF								

Appendix 9: Pacific Gas and Electric Retention Schedules Compared to ASME, Code of Federal Regulations and General Order 112 Requirements

		(P2-195); Effective Date: 9/1/1964		(P2-212); Effective Date: 4/6/1994		(P2-225); Effective Date: 3/14/2005		(P2-227); Effective Date: 5/22/2008		(P2-230) Effective Date: 4/16/2010	
Record Type	Source of Policies/Standards/Rules#	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period
Gas Service Record	PG&E	P2-195 (Leak Survey Records)	Office: P Total: P	P2-212	Life of facility	P2-225	Life of facility	P2-227	Life of facility	P2-230	Mandated Retention Period: Life of facility Recommended Disposal Period: After fulfilling mandated retention
	ASME (1955, 1958, 1963, 1967, 1968, 1975)	851.5	Leak Survey Records must be kept LoF								
	ASME (1986, 1989, 1995, 1999)			851.6	Leak Survey Records must be kept LoF.	851.6	Leak Survey Records must be kept LoF				
	ASME (2007)							851.6	Leak Survey Records must be kept LoF		
	ASME (2010)									851.6	Leak Survey Records must be kept LoF
	CFR (08/19/1970)			192.709	LoF						
	CFR (6/6/1996)			192.706 and 192.709	Either 5 years or until the next leak survey record is made, whichever is greater.	192.706 and 192.709	Either 5 years or until the next leak survey record is made, whichever is greater.	192.706 and 192.709	Either 5 years or until the next leak survey record is made, whichever is greater.	192.706 and 192.709	Either 5 years or until the next leak survey record is made, whichever is greater.
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	LoF								
Engineering Records	PG&E	N/A	N/A	P2-212 (Engineering Record/Drawings/Support Data)	Records pertinent to the constructed facility retain until superseded or 6 years after the facility is retired. If construction of facility does not result, destroy at option after a complete accounting of expenses incurred	P2-225 (Engineering Record/Drawings/Support Data)	Records pertinent to the constructed facility retain until superseded or 6 years after the facility is retired. If construction of facility does not result, destroy at option after a complete accounting of expenses incurred	P2-227(Engineering Record/Drawings/Support Data)	Records pertinent to the constructed facility retain until superseded or 6 years after the facility is retired. If construction of facility does not result, destroy at option after a complete accounting of expenses incurred	P2-230	Mandated Retention Period: 6 years after facility is retired Recommended Disposal Period: 6 years after facility is retired
	ASME										
	CFR (02/11/1994)			192.605(a) and (b)(3)	PG&E must have an Operations and Maintenance Manual that must include procedures for making construction records, maps, and operating history available to appropriate personnel.	192.605(a) and (b)(3)	PG&E must have an Operations and Maintenance Manual that must include procedures for making construction records, maps, and operating history available to appropriate personnel.	192.605(a) and (b)(3)	PG&E must have an Operations and Maintenance Manual that must include procedures for making construction records, maps, and operating history available to appropriate personnel.	192.605(a) and (b)(3)	PG&E must have an Operations and Maintenance Manual that must include procedures for making construction records, maps, and operating history available to appropriate personnel.
	GO112										
Emergency Shutdown Procedures	PG&E	N/A	N/A	P2-212	Destroy at option after expiration or supersession	P2-225	Destroy at option after expiration or supersession	P2-227	Destroy at option after expiration or supersession	P2-230	Mandated Retention Period: Updates kept until next revision Recommended Disposal Period: Updates kept until next revision
	ASME										
	CFR (08/19/1970; 03/31/1976)			192.615	Have written emergency procedure	192.615	Have written emergency procedure	192.615	Have written emergency procedure	192.615	Have written emergency procedure
	GO112										

Appendix 9: Pacific Gas and Electric Retention Schedules Compared to ASME, Code of Federal Regulations and General Order 112 Requirements

		(P2-195); Effective Date: 9/1/1964		(P2-212); Effective Date: 4/6/1994		(P2-225); Effective Date: 3/14/2005		(P2-227); Effective Date: 5/22/2008		(P2-230) Effective Date: 4/16/2010	
Record Type	Source of Policies/Standards/Rules #	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period
Anode Record	PG&E	P2-195	Office: T	P2-212	Life of equipment	P2-225	Life of equipment	P2-227	Life of equipment	P2-230	Mandated Retention Period: Life of equipment Recommended Disposal Period: Life of equipment
	ASME										
	CFR										
	GO112										
Cathodic Protection Records	PG&E	N/A	N/A	P2-212	Cathodic Protection Reports and CP Station Reports to be Kept- Life of Facility	P2-225	Cathodic Protection Reports and CP Station Reports to be Kept- Life of Facility	P2-227	Cathodic Protection Reports and CP Station Reports to be Kept- Life of Facility	P2-230	Mandated Retention Period: LoF. Recommended Disposal Period: LoF.
	ASME (1955, 1958, 1963, 1967, 1968)	851.4	If there is CP, make records showing its adequacy and condition of pipe coating.								
	ASME (1975, 1986)			865	LoF if necessary to evaluate need for or effectiveness of corrosion control measures.						
	ASME (1992)			A864.41	LoF						
	ASME (1995, 1999)					867	LoF				
	ASME (2007)							867	LoF	867	LoF
	CFR (1996)					192.491	LoF	192.491	LoF	192.491	LoF
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	If there is CP, make records showing its adequacy and condition of pipe coating.								
Corrosion Records	PG&E	N/A	N/A	P2-212	Life of facility	P2-225	Life of facility	P2-227	Life of facility	P2-230	Mandated Retention Period: Life of facility Recommended Disposal Period: Life of facility
	ASME (1955, 1958, 1963, 1967, 1968)	851.4	Make records of corrosion conditions found on each pipeline.	851.4	Make records of corrosion conditions found on each pipeline.						
	ASME (1975, 1986)			865	LoF						
	ASME (1989)			867	LoF						
	ASME (1992)			A864.42	LoF						
	ASME (1995, 1999)					867	LoF				
	ASME (2007)							867	LoF	867	LoF
	CFR (1996)	N/A	N/A	N/A	N/A	192.491(c)	At least 5 years to show adequacy of corrosion control measures or that a corrosive condition does not exist.	192.491(c)	At least 5 years to show adequacy of corrosion control measures or that a corrosive condition does not exist.	192.491(c)	At least 5 years to show adequacy of corrosion control measures or that a corrosive condition does not exist.
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	Make records of corrosion conditions found on each pipeline.								

Appendix 9: Pacific Gas and Electric Retention Schedules Compared to ASME, Code of Federal Regulations and General Order 112 Requirements

		(P2-195); Effective Date: 9/1/1964		(P2-212); Effective Date: 4/6/1994		(P2-225); Effective Date: 3/14/2005		(P2-227); Effective Date: 5/22/2008		(P2-230) Effective Date: 4/16/2010	
Record Type	Source of Policies/Standards/Rules#	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period
Inspection Records-Leak Repair or Pipe Exposure	PG&E	N/A	N/A	P2-212	Life of facility	P2-225	Life of facility	P2-227	Life of facility	P2-230	Mandated Retention Period: Life of facility Recommended Disposal Period: Life of facility
	ASME (1955, 1958, 1963, 1967, 1968, 1975)	851.5	LoF.								
	ASME (1986, 1989, 1995, 1999)			851.6	LoF	851.6	LoF				
	ASME (2007, 2010)							851.6	LoF	851.6	LoF
	CFR (08/19/1971) (Amended 06/06/1996)			192.709	Repair records must be kept for LoF.	192.709	Repair records must be kept for LoF.	192.709	Repair records must be kept for LoF.	192.709	Repair records must be kept for LoF.
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	LoF								
Line Patrol Reports	PG&E	P2-195	Office: 1Total: 3	P2-212	Life of facility for numbered gas transmission lines, 3 years for all others	P2-225	Life of facility for numbered gas transmission lines, 3 years for all others	P2-227	Life of facility for numbered gas transmission lines, 3 years for all others	P2-230 (ED – Gas Maintenance and Construction: Line Patrol Reports)	Mandated Retention Period: Life of facility for numbered gas transmission lines Recommended Disposal Period: Life of facility
	ASME (1955, 1958, 1963, 1967, 1968, 1975)	851.5	LoF.								
	ASME (1986, 1989, 1995, 1999)			851.6	LoF	851.6	LoF				
	ASME (2007, 2010)							851.6	LoF	851.6	LoF
	CFR (08/19/1970)			192.709	LoF						
	CFR (06/06/1996)			192.709	Either 5 years or until the next Line patrol report or record is made, whichever is greater.	192.709	Either 5 years or until the next Line patrol report or record is made, whichever is greater.	192.709	Either 5 years or until the next Line patrol report or record is made, whichever is greater.	192.709	Either 5 years or until the next Line patrol report or record is made, whichever is greater.
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	LoF								
Line Inspection Reports	PG&E	N/A	N/A	P2-212 (Line Inspection Reports)	Gas Transmission and Distribution - 3 years	P2-225 (Line Inspection Reports)	Gas Transmission and Distribution - 3 years	P2-227 (Line Inspection Reports)	Gas Transmission and Distribution - 3 years	P2-3 (and P2-230)	9 years
	ASME (1955, 1958, 1963, 1967, 1968, 1975)	851.5	LoF.								
	ASME (1986, 1989, 1995, 1999)			851.6	LoF	851.6	LoF				
	ASME (2007, 2010)							851.6	LoF	851.6	LoF
	CFR (08/19/1970)			192.709	LoF						
	CFR (6/6/1996)			192.709	Either 5 years or until the next line inspection report or record is made, whichever is greater.	192.709	Either 5 years or until the next line inspection report or record is made, whichever is greater.	192.709	Either 5 years or until the next line inspection report or record is made, whichever is greater.	192.709	Either 5 years or until the next line inspection report or record is made, whichever is greater.
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	LoF								
Asset History Records	PG&E	N/A	N/A	P2-212 (Electric Supply: History Records –Equipment)	Life of equipment	P2-225 (History Records –Equipment)	Life of equipment	P2-227 (History Records –Equipment)	Life of equipment	P2-225 (ED – Electric Maintenance & Construction, Includes Transmission and Substation: Asset History Records)	Mandated Retention Period: Life of equipment Recommended Disposal Period: Life of equipment
	ASME										
	CFR										
	GO112										

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		(P2-195); Effective Date: 9/1/1964		(P2-212); Effective Date: 4/6/1994		(P2-225); Effective Date: 3/14/2005		(P2-227); Effective Date: 5/22/2008		(P2-230) Effective Date: 4/16/2010	
Record Type	Source of Policies/Standards/Rules#	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period
Transmission Line Inspections, Including Patrol Maintenance Reports, Trouble Reports and Line Logs	PG&E	P2-195 (Line Trouble)	Office: 1 Total: 3	P2-212 (Trouble Report)	6 years	P2-225 (Trouble Report)	6 years	P2-227 (Trouble Report)	6 years	N/A	N/A
	ASME (1955, 1958, 1963, 1967, 1968, 1975)	851.5	LoF.								
	ASME (1986, 1989, 1995, 1999)			851.6	LoF	851.6	LoF				
	ASME (2007, 2010)							851.6	LoF	851.6	LoF
	CFR (08/19/1970)			192.709	LoF						
	CFR (06/06/1996)			192.709	Either 5 years or until the next line inspection report or record is made, whichever is greater.	192.709	Either 5 years or until the next line inspection report or record is made, whichever is greater.	192.709	Either 5 years or until the next line inspection report or record is made, whichever is greater.	192.709	Either 5 years or until the next line inspection report or record is made, whichever is greater.
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	LoF								
Transmission Outage Reports, Outage Interruption Reports, and Line Operating Reports	PG&E	P2-195 (Transmission Flow Charts)	Office: 1 Total: 3								
	ASME										
	CFR										
	GO112										
Transmission Outage Interruption Reports	PG&E	N/A	N/A	P2-212 (Interruption Reports – Service)	Gas Transmission and Distribution – 6 years	P2-225 (Interruption Reports – Service)	Gas Transmission and Distribution – 6 years	P2-227 (Interruption Reports – Service)	Gas Transmission and Distribution – 6 years		
	ASME										
	CFR										
	GO112										
Transmission Outage: Line Operating Reports	PG&E	N/A	N/A	P2-212 (Transmission Line Operating Reports)	Gas Transmission and Distribution – 3 years	P2-225 (Transmission Line Operating Reports)	Gas Transmission and Distribution – 3 years	P2-227 (Transmission Line Operating Reports)	Gas Transmission and Distribution – 3 years	P2-230 (ED - Gas Maintenance and Construction: Transmission Line Operating Reports)	Mandated Retention Period: 3 years Recommended Disposal Period: 5 years
	ASME										
	CFR										
	GO112										
Mapping Job Folders	PG&E	P2-195	Office: T	N/A	N/A	N/A	N/A	N/A	N/A	P2-230 (ED - Technical Services: As Built Records of Facilities, Mapping Job Folders Including Estimates, Inspection Logs)	Mandated Retention Period: Until retired Recommended Disposal Period: Life of the facility
	ASME										
	CFR										
	GO112										

Appendix 9: Pacific Gas and Electric Retention Schedules Compared to ASME, Code of Federal Regulations and General Order 112 Requirements

		(P2-195); Effective Date: 9/1/1964		(P2-212); Effective Date: 4/6/1994		(P2-225); Effective Date: 3/14/2005		(P2-227); Effective Date: 5/22/2008		(P2-230) Effective Date: 4/16/2010	
Record Type	Source of Policies/Standards/Rules#	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period
Inspection Logs	PG&E	N/A	N/A	P2-212 (Logs – Inspection and SPCC Compliance)[9]	Permanent	P2-225 (Logs – Inspection and SPCC Compliance)[9]	Permanent	P2-227 (Logs – Inspection and SPCC Compliance)[9]	Permanent	P2-230 (ED - Technical Services: As Built Records of Facilities, Mapping Job Folders Including Estimates, Inspection Logs)	Mandated Retention Period: Until retired Recommended Disposal Period: Life of the facility
	ASME (1955, 1958, 1963, 1967, 1968, 1975)	851.5	LoF.								
	ASME (1986, 1989, 1995, 1999)			851.6	LoF	851.6	LoF				
	ASME (2007, 2010)							851.6	LoF	851.6	LoF
	CFR (08/19/1970)			192.709	LoF						
	CFR (06/06/1996)			192.709	Either 5 years or until the next line inspection report or record is made, whichever is greater.	192.709	Either 5 years or until the next line inspection report or record is made, whichever is greater.	192.709	Either 5 years or until the next line inspection report or record is made, whichever is greater.	192.709	Either 5 years or until the next line inspection report or record is made, whichever is greater.
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	LoF								
Gas High Pressure Test Record	PG&E	P2-195	Office: 6 Total: T	P2-212	3 Years	P2-225	3 Years	P2-227	3 Years	N/A	N/A
	ASME (1955, 1958, 1963, 1967, 1968)	841.417	Test Pressure Records Required for LoF								
	ASME (1975)			841.327	Test Pressure Records Required for Life of Facility						
	ASME (1986, 1989)			841.327	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.						
	ASME (1992. 1995, 1999)			841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.	841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.				
	ASME (2007, 2010)							841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.	841.4.5	Permanent function-testing records of pipeline monitoring are required.

		(P2-195); Effective Date: 9/1/1964		(P2-212); Effective Date: 4/6/1994		(P2-225); Effective Date: 3/14/2005		(P2-227); Effective Date: 5/22/2008		(P2-230) Effective Date: 4/16/2010	
Record Type	Source of Policies/Standards/Rules#	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period
	CFR (08/19/1970)	N/A	N/A	192.505 and 192.517	For pipelines operating at hoop stress of 30% or more of SMYS, retain for LoF the following: Operator's name, name of employee making the test. Test medium used. Test pressure. Test duraction. Pressure recording charts or other record of pressure readings. Leaks and failures noted and their disposition.	192,505 and 192.517	For pipelines operating at hoop stress of 30% or more of SMYS, retain for LoF the following: Operator's name, name of employee making the test. Test medium used. Test pressure. Test duraction. Pressure recording charts or other record of pressure readings. Leaks and failures noted and their disposition.	192,505 and 192.517	For pipelines operating at hoop stress of 30% or more of SMYS, retain for LoF the following: Operator's name, name of employee making the test. Test medium used. Test pressure. Test duraction. Pressure recording charts or other record of pressure readings. Leaks and failures noted and their disposition.	192,505 and 192.517	For pipelines operating at hoop stress of 30% or more of SMYS, retain for LoF the following: Operator's name, name of employee making the test. Test medium used. Test pressure. Test duraction. Pressure recording charts or other record of pressure readings. Leaks and failures noted and their disposition.
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	LoF								
Pressure Charts: Transmission and Distribution	PG&E	P2-195	Office 1: Total: 3	N/A		P2-225	Charts for Transmission Line, Flow, Holder, and Miscellaneous Pressure-3 Years	P2-227	Charts for Transmission Line, Flow, Holder, and Miscellaneous Pressure-3 Years	N/A	N/A
	ASME (1955, 1958, 1963, 1967, 1968)	841.417	Test Pressure Records Required for LoF								
	ASME (1975)			841.327	Test Pressure Records Required for Life of Facility						
	ASME (1986, 1989)			841.327	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.						
	ASME (1992. 1995, 1999)			841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.	841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.				
	ASME (2007, 2010)							841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.	841.4.5	Permanent function-testing records of pipeline monitoring are required.
	CFR (08/19/1970)	N/A	N/A	192.505 and 192.517	For pipelines operating at 30% SMYS or more, pressure record charts must be kept for LoF.	192.505 and 192.517	For pipelines operating at 30% SMYS or more, pressure record charts must be kept for LoF.	192.505 and 192.517	For pipelines operating at 30% SMYS or more, pressure record charts must be kept for LoF.	192.505 and 192.517	For pipelines operating at 30% SMYS or more, pressure record charts must be kept for LoF.
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	LoF								

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		(P2-195); Effective Date: 9/1/1964		(P2-212); Effective Date: 4/6/1994		(P2-225); Effective Date: 3/14/2005		(P2-227); Effective Date: 5/22/2008		(P2-230) Effective Date: 4/16/2010	
Record Type	Source of Policies/Standards/Rules#	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period
Pressure Survey Reports	PG&E	P2-195	Office 1: Total 3	N/A	N/A	P2-225	N/A	P2-227	N/A	N/A	N/A
	ASME (1955, 1958, 1963, 1967, 1968)	841.417	Test Pressure Records Required for LoF								
	ASME (1975)	N/A	N/A	841.327	Test Pressure Records Required for Life of Facility						
	ASME (1986, 1989)	N/A	N/A	841.327	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.						
	ASME (1992. 1995, 1999)	N/A	N/A	841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.	841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.				
	ASME (2007, 2010)							841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.	841.4.5	Permanent function-testing records of pipeline monitoring are required.
	CFR (08/19/1970)	N/A	N/A	192.505 and 192.517	For pipelines operating at 30% SMYS or more, records of pressure readings must be kept for LoF	192.505 and 192.517	For pipelines operating at 30% SMYS or more, records of pressure readings must be kept for LoF	192.505 and 192.517	For pipelines operating at 30% SMYS or more, records of pressure readings must be kept for LoF	192.505 and 192.517	For pipelines operating at 30% SMYS or more, records of pressure readings must be kept for LoF
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	LoF								
Pressure Records for MAOP Pressure Verification (Dist and Dim)	PG&E					P2-225	Chart of MAOP Pressure Verification (Dist and Dim) Life of Facility	P2-227	Chart of MAOP Pressure Verification (Dist and Dim) Life of Facility	P2-230	Chart of MAOP Pressure Verification (Dist and Dim) Life of Facility
	ASME (1955, 1958, 1963, 1967, 1968)	841.417	Test Pressure Records Required for LoF								
	ASME (1975)			841.327	Test Pressure Records Required for Life of Facility						
	ASME (1986, 1989)			841.327	Test Pressure Records Showing Procedures Used and Data Developed in						
	ASME (1992. 1995, 1999)			841.326	Test Pressure Records Showing Procedures Used and Data Developed in	841.326	Test Pressure Records Showing Procedures Used and Data Developed in				
	ASME (2007, 2010)							841.326	Test Pressure Records Showing Procedures Used and Data Developed in	841.4.5	Permanent function-testing records of pipeline monitoring are required.
	CFR										
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	LoF								

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		(P2-195); Effective Date: 9/1/1964		(P2-212); Effective Date: 4/6/1994		(P2-225); Effective Date: 3/14/2005		(P2-227); Effective Date: 5/22/2008		(P2-230) Effective Date: 4/16/2010	
Record Type	Source of Policies/Standards/Rules#	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period
Gas Pressure Department Reports	PG&E					P2-225	Gas Transmission & Distribution-3 Years	P2-227	N/A	N/A	N/A
	ASME (1955, 1958, 1963, 1967, 1968)	841.417	Test Pressure Records Required for LoF								
	ASME (1975)			841.327	Test Pressure Records Required for Life of Facility						
	ASME (1986, 1989)			841.327	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.						
	ASME (1992. 1995, 1999)			841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.	841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.				
	ASME (2007, 2010)							841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.	841.4.5	Permanent function-testing records of pipeline monitoring are required.
	CFR										
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	LoF								

		(P2-195); Effective Date: 9/1/1964		(P2-212); Effective Date: 4/6/1994		(P2-225); Effective Date: 3/14/2005		(P2-227); Effective Date: 5/22/2008		(P2-230) Effective Date: 4/16/2010	
Record Type	Source of Policies/Standards/Rules#	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period
Fluid Used for Testing	PG&E										
	ASME (1955, 1958, 1963, 1967, 1968)	841.417	Type of Fluid Used for Testing Is Required for LoF								
	ASME (1975)			841.327	Type of Fluid Used for Testing Is Required for LoF						
	ASME (1986, 1989)			841.327	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.						
	ASME (1992. 1995, 1999)			841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.	841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.				
	ASME (2007, 2010)							841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.	841.4.5	Permanent function-testing records of pipeline monitoring are required.
	CFR (08/19/1970)			192.505 and 192.517	For pipelines operating at 30% SMYS or more, records showing test medium used on a pipeline must be kept for LoF.	192.505 and 192.517	For pipelines operating at 30% SMYS or more, records showing test medium used on a pipeline must be kept for LoF.	192.505 and 192.517	For pipelines operating at 30% SMYS or more, records showing test medium used on a pipeline must be kept for LoF.	192.505 and 192.517	For pipelines operating at 30% SMYS or more, records showing test medium used on a pipeline must be kept for LoF.
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	LoF								
Changes In Class Location	PG&E										
	CFR (8/19/1970)			192.611	If hoope stress corresponding to established MAOP of a pipeline segment does not fit the present class location, and the segment has not been previously tested, it must be tested, and test pressure records must be kept for LoF.	192.611	If hoope stress corresponding to established MAOP of a pipeline segment does not fit the present class location, and the segment has not been previously tested, it must be tested, and test pressure records must be kept for LoF.	192.611	If hoope stress corresponding to established MAOP of a pipeline segment does not fit the present class location, and the segment has not been previously tested, it must be tested, and test pressure records must be kept for LoF.	192.611	If hoope stress corresponding to established MAOP of a pipeline segment does not fit the present class location, and the segment has not been previously tested, it must be tested, and test pressure records must be kept for LoF.

		(P2-195); Effective Date: 9/1/1964		(P2-212); Effective Date: 4/6/1994		(P2-225); Effective Date: 3/14/2005		(P2-227); Effective Date: 5/22/2008		(P2-230) Effective Date: 4/16/2010	
Record Type	Source of Policies/Standards/Rules #	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period
Records of Welds	PG&E	P2-195	Welding Reports: T	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	CFR (08/19/1970)		Records of number of girth welds made, nondestructively tested, rejected, and disposition of rejects must be kept for the life of all pipelines operated at a pressure of at least 20% SMYS.*	192.241 and 192.243	Records of number of girth welds made, nondestructively tested, rejected, and disposition of rejects must be kept for the life of all pipelines operated at a pressure of at least 20% SMYS.*	192.241 and 192.243	Records of number of girth welds made, nondestructively tested, rejected, and disposition of rejects must be kept for the life of all pipelines operated at a pressure of at least 20% SMYS.*	192.241 and 192.243	Records of number of girth welds made, nondestructively tested, rejected, and disposition of rejects must be kept for the life of all pipelines operated at a pressure of at least 20% SMYS.*	192.241 and 192.243	Records of number of girth welds made, nondestructively tested, rejected, and disposition of rejects must be kept for the life of all pipelines operated at a pressure of at least 20% SMYS.*
Welder Qualifications Records	PG&E										
	ASME (1955)	841.417	Keep for the entire length of construction .								
	ASME (1958, 1963, 1967, 1968)	824.25	Keep for the entire length of construction .								
	ASME (1975, 1986, 1989)	823.4	Keep for the entire length of construction .								
	ASME (1992)			823.4	Keep for the entire length of construction .						
	ASME (1995, 1999)					823.4	Keep for the entire length of construction .				
	CFR										
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	Keep for the entire length of construction .								
Welding Procedure Test Qualifications	PG&E										
	ASME (1955, 1958, 1963, 1967, 1968)	824.25	Keep records as long as procedure is still in use.								
	ASME (1975, 1986, 1989)	823.4	Keep records as long as procedure is still in use.								
	ASME (1992)			823.4	Keep records as long as procedure is still in use.						
	ASME (1995, 1999)					823.4	Keep records as long as procedure is still in use.				
	CFR (08/19/1970)			192.225	Must be recorded in detail, including results of qualifying tests, retained, and followed whenever procedure is used.	192.225	Must be recorded in detail, including results of qualifying tests, retained, and followed whenever procedure is used.	192.225	Must be recorded in detail, including results of qualifying tests, retained, and followed whenever procedure is used.	192.225	Must be recorded in detail, including results of qualifying tests, retained, and followed whenever procedure is used.
	GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	Keep records as long as procedure is still in use.								

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Appendix 9: Pacific Gas and Electric Retention Schedules Compared to ASME, Code of Federal Regulations and General Order 112 Requirements

		(P2-195); Effective Date: 9/1/1964		(P2-212); Effective Date: 4/6/1994		(P2-225); Effective Date: 3/14/2005		(P2-227); Effective Date: 5/22/2008		(P2-230) Effective Date: 4/16/2010	
Record Type	Source of Policies/Standards/Rules #	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period	Reference	Retention Period

*Keeping these records is not required if a pipe has a diameter of 6 inches or less, or if the pipe is operated at less than 40% SMYS and the number of welds are so limited that nondestructive testing is impractical.
**General Orders 112, 112A, and 112B, Sections 107 all required that gas transmission facilities be constructed and operated in compliance with the current ASME standards, unless the General Orders explicitly said otherwise. This is why most General Order 112 requirements mirror ASME requirements for a given subject area until April 30, 1971, when General Order 112C was adopted without such a requirement.
***All references to ASME by date mean the following references. The section number of the ASME standard is given in the column immediately preceding the rule it cites.
ASME 1955 refers to ASA B31.1.8-1955, Section 8 of ASA Code for Pressure Piping.
ASME 1958 refers to ASA B31.8-1958, Section 8 of ASA Code for Pressure Piping.
ASME 1963 refers to ASA B31.8-1963, ASA Code for Pressure Piping.
ASME 1967 refers to ASA B31.8-1967, USA Standard Code for Pressure Piping.
ASME 1968 refers to ASA B31.8-1968, USA Standard Code for Pressure Piping.
ASME 1975 refers to ANSI B31.8-1975 American National Standard Code for Pressure Piping.
ASME 1986 refers to ANSI ASME B31.8-ASME Code for Pressure Piping, B31 An American Standard, 1986 Edition
ASME 1989 refers to ANSI ASME B31.8-ASME Code for Pressure Piping, B31 An American Standard, 1989 Edition
ASME 1992 refers to ANSI ASME B31.8-ASME Code for Pressure Piping, B31 An American Standard, 1992 Edition
ASME 1995 refers to ASME B31.8-1995 Edition-ASME Code for Pressure Piping, B31 An American National Standard.
ASME 1999 refers to ASME B31.8-1999 Edition-ASME Code for Pressure Piping, B31 An American National Standard.
ASME 2007 refers to ASME B31.8-2007 Edition-ASME Code for Pressure Piping, B31, An American National Standard
ASME 2010 refers to ASME B31.8S-2010 Edition-ASME Code for Pressure Piping, B31, An American National Standard
****All references to CFR are to 49 CFR Section 192. The particular portion of section 192 is referenced in the column immediately preceding the rule it cites.
*****All references to PG&E policies are found in the PG&E's P2 attachments. For example, a citation to P2-195 precedes PG&E policies found in attachment P2-195.

#Since 1951 Cal. Pub. Util. Code §451 has required that, "Every public utility shall furnish and maintain such adequate, efficient, just, and reasonable service, instrumentalities, equipment, and facilities. . .as are necessary to promote the safety, health, comfort, and convenience of its patrons, employees, and the public." Moreover, from 1911 to 1951, Cal. Pub. Util. Act, Article II, §13(b) required that, "Every public utility shall furnish, provide and maintain such service, instrumentalities, equipment and facilities as shall promote the safety, health, comfort and convenience of its patrons, employees and the public. . ." Therefore, from 1911 until the present, these laws have consistently required PG&E to maintain instrumentalities, equipment, and facilities, including records, to promote the safety of their respective patrons, employees and the public.

Appendix 9: Pacific Gas and Electric Strength Test Pressure Requirements Compared with Other Pressure Test Requirements

Strength Test Pressure Reports	Reference	Retention Requirement
PG&E Policy (1965)	P2-902 (10/1/1965)	Strength tests required for mains from 0-1040 psig. For each such requirement, a strength test pressure report must be kept for Life of the Facility (LoF).
PG&E Policy (1968-2003)	P2-906 (2/26/1968); P2-908 (9/10/1970); P2-909 (2/17/1972); P2-918 (1/25/1973); P2-933 (3/19/1984); P2-939 (8/6/1990); P2-940 (11/2/1992); P2-942 (2/28/1995); P2-945(10/19/1998); P2-951(12/9/2003);	Strength tests pressure report is required for all pipelines operating over 100 psi. Strength test pressure reports must be retained for LoF.
ASME (1955, 1958, 1963, 1967, 1968)	841.417	Test Pressure Records Required for LoF
ASME (1975)	841.327	Test Pressure Records Required for Life of Facility
ASME (1986, 1989)	841.327	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.
ASME (1992, 1995, 1999, 2007)	841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.
ASME (2010)	841.4.5	Permanent function-testing records of pipeline monitoring are required.
CFR (08/19/1970)	192.505 and 192.517	For pipelines operating at 30% SMYS or more, records of pressure readings must be kept for LoF
GO112 1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)**	Section 107	Life of the Facility (LoF)

**PG&E strength test pressure report retention policies dating back to 9/10/1970 explicitly stated their purpose to establish a uniform procedure for designing and testing gas piping systems that will meet the requirements of GO 112 and 49 CFR Sections 191, 101, and 192.501. Moreover, PG&E's strength test pressure report policy from 10/1/1965 (P2-902) had the explictly stated purpose of establishing a uniform company policy for designing and testing gas piping systems to conform to the requirements of GO 112 of the CPUC.

Appendix 9: Pacific Gas and Electric Operating Pressure Thresholds Triggering Prioritization of a Covered Pipeline Segment as High Risk

Operating Pressure Thresholds Triggering Prioritization of a Covered Pipeline Segment as High Risk	Reference	Threshold Triggering Classification of a Covered Pipeline Segment as High Risk for the Baseline Assessment or Next Reassessment
CFR	192.917(e)(3) (12/15/2003)	Operating pressure increase above maximum operating pressure experienced during the preceding five years.
PG&E Policy Submitted to NTSB	Risk Management Instruction (RMI)-6 Submitted to NTSB.**	Operating pressure increase above maximum operating pressure experienced during the preceding five years plus 10 percent of historical operating pressure.*

*Note: PG&E asserts in response to CPSD DR 15 Question 2 that it inadvertantly submitted this policy to NTSB as a draft without ever approving it. PG&E further asserts that it has not approved an additional 10 percent of historical operating pressure in the RMI-6 when submitting its draft policy to NTSB, or today.

**See PG&E Data Response to CPSD Data Request 15, Question 2.

Appendix 9: Pacific Gas and Electric Pressure Test Chart Retention Requirements

Pressure Test Charts	Reference	Retention Requirement
PG&E Policy (1973)**	P2-918 (1/25/1973)	Pressure Test Charts Required to Be Kept for Life of Facility for New Lines Operating at Over 30% SMYS, and for All Lines Being Uprated LoF
PG&E Policy (1984)**	P2-933 (3/19/1984)	Pressure Test Charts Required to Be Kept for Life of Facility for New and Reinstated Lines Operating at Over 30% SMYS, and for All Lines Being Uprated LoF
PG&E Policy (1990; 1992; 1995; 1998; 2003)**	P2-939 (8/6/1990); P2-940 (11/2/1992); P2-942 (2/28/1995); P2-945 (10/19/1998); P2-951 (12/9/03)	For pipelines being tested or uprated to support an MAOP equivalent to 30% or greater, test charts must be kept for LoF.
ASME (1955, 1958, 1963, 1967, 1968)	841.417	Test Pressure Records Required for LoF
ASME (1975)	841.327	Test Pressure Records Required for Life of Facility
ASME (1986, 1989)	841.327	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.
ASME (1992. 1995, 1999, 2007)	841.326	Test Pressure Records Showing Procedures Used and Data Developed in Establishing MAOP Required for LoF.
ASME (2010)	841.4.5	Permanent function-testing records of pipeline monitoring are required.
CFR (8/19/1970)	192.505 and 192.517	For pipelines operating at 30% SMYS or more, records of pressure readings must be kept for LoF
GO112 (1/17/1961), GO112A (12/3/1963), GO 112B (12/1/1967)	Section 107	LoF

**PG&E pressure chart retention policies dating back to 9/10/1970 explicitly stated their purpose to establish a uniform procedure for designing and testing gas piping systems that will meet the requirements of GO 112 and 49 CFR Sections 191, 101, and 192.501.