



RMP-15- Gas Distribution Integrity Management Program

Risk Management Procedure
RMP-15, Revision 5
Gas Distribution Integrity Management Program

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Revision History

Rev. No.	Date	Description	Prepared by	Recommend	Concur	Concur	Approved by
0	04/30/08	Initial Issue	WJM8	Supervisor, T&D Integrity WJM8	Manager, Technical Services RPF2	Director, Gas Engineering GECj	Vice President, Gas Transmission and Distribution
1	1/24/2010	General Revisions to bring RMP-15 into alignment with 49 CFR192 subpart P and new organization structure	WJM8	Manager of Integrity Management SEBE	Director of Integrity Management and Technical Support RPF2	Sr. Director, Gas Engineering GECj	Vice President, Gas Transmission and Distribution RTHC
2	7/29/2011	Major revisions to content to accurately reflect PG&E's DIMP program elements and risk algorithm methods.	EEM6	Manager of Integrity Management SEBE	Director of Integrity KSR2	Vice President, Managing Director, Law SLHb	Vice President, Gas Engineering & Operations JKY1
3	11/11/2012	Major revisions to content to accurately reflect PG&E's DIMP program elements and risk algorithm methods.	EEM6	Sr. Manager, DIMP RxT5	Director of Integrity Management ECCa	Vice President, Managing Director, Law SLHb	Vice President, Public Safety & Asset Integrity. RIT4
4	03/14/2013	Revisions to content as a result of State and Federal audit of DIMP program.	JLEM	Sr. Manager, DIMP RxT5	Director of Integrity Management ECCa	Vice President, Managing Director, Law SLHb	Vice President, Public Safety & Asset Integrity. RIT4
5	03/14/2014	Additional revisions to content as a result of State and Federal audit of DIMP program.	JLEM	Manager, DIMP	Director of Distribution Integrity Management	Vice President, Managing Director, Law	Vice President, Asset and Risk Management



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1. INTRODUCTION

1.1 Distribution Integrity Management at PG&E

This Integrity Management (IM) Plan (RMP-15) provides methods and implementation processes to ensure the safety of the gas distribution systems owned and operated by Pacific Gas and Electric Company (Company) throughout the Company's service area and to meet the requirements of 49 CFR 192 Subpart P—Gas Distribution Pipeline Integrity Management. RMP-15 provides the overarching framework for the Company's Distribution Integrity Management Program (DIMP). Risk Management Instructions (RMIs) supplement procedures and provide the implementation instructions for specific components of the program.

RMP-15 is the controlling document for the integrity management of PG&E's gas distribution system. Where there are discrepancies between this procedure and other supporting documents, this procedure shall take precedence.

The Distribution Integrity Management Program provides a way to evaluate the Company's gas distribution system in order to rank risks to pipeline integrity and prioritize mitigation activities. This information is used to develop appropriate mitigation plans, to remediate or improve Company assets that may pose a threat to public safety or the efficient delivery of safe and reliable gas service. Integrity Management at PG&E focuses on:

- Transporting natural gas in a safe, reliable, and efficient manner from transmission pressure facilities to distribution main facilities.
- Transporting natural gas in a safe, reliable, and efficient manner from distribution main facilities to distribution services, and ultimately customer connected equipment.
- Protecting the public – including customers and the general public and their assets and property. IM provides the tools and processes for risk ranking and prioritization, ensuring that PG&E focuses on identifying threats to its system and remediating them appropriately.

PG&E's system risk assessment approach is a historical leak-based risk model. This model considers five years of historical data of repaired leaks and applies a consequence factor to each leak to establish a risk score for each leak. PG&E performs root cause analyses to determine if appropriate programs and activities to address risk are in place to effectively mitigate threats. PG&E schedules, documents, and tracks its Distribution Integrity Management Program using ICAM, a quality management platform provided by PI Confluence. Any future changes in activity management software, including the use of SAP, will be documented here and reflected in future revisions of RMP-15.

1.2 Distribution Integrity Management Program Framework

PG&E's Distribution Integrity Management Program builds upon existing programs to address the following key elements:

- Knowing the system and infrastructure
- Identifying and characterizing known and potential threats
- Evaluating risks
- Identifying and implementing measures to manage or eliminate risks
- Measuring and monitoring performance
- Evaluating and improving performance
- Reporting results



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1.3 Distribution Integrity Management Program Cycle

PG&E strives to continually improve the safety of its distribution system. As such, RMP-15 will be updated as part of PG&E's annual DIMP cycle to include additional process improvements, risk identification efforts and mitigation actions as indicated below in Figure 1.

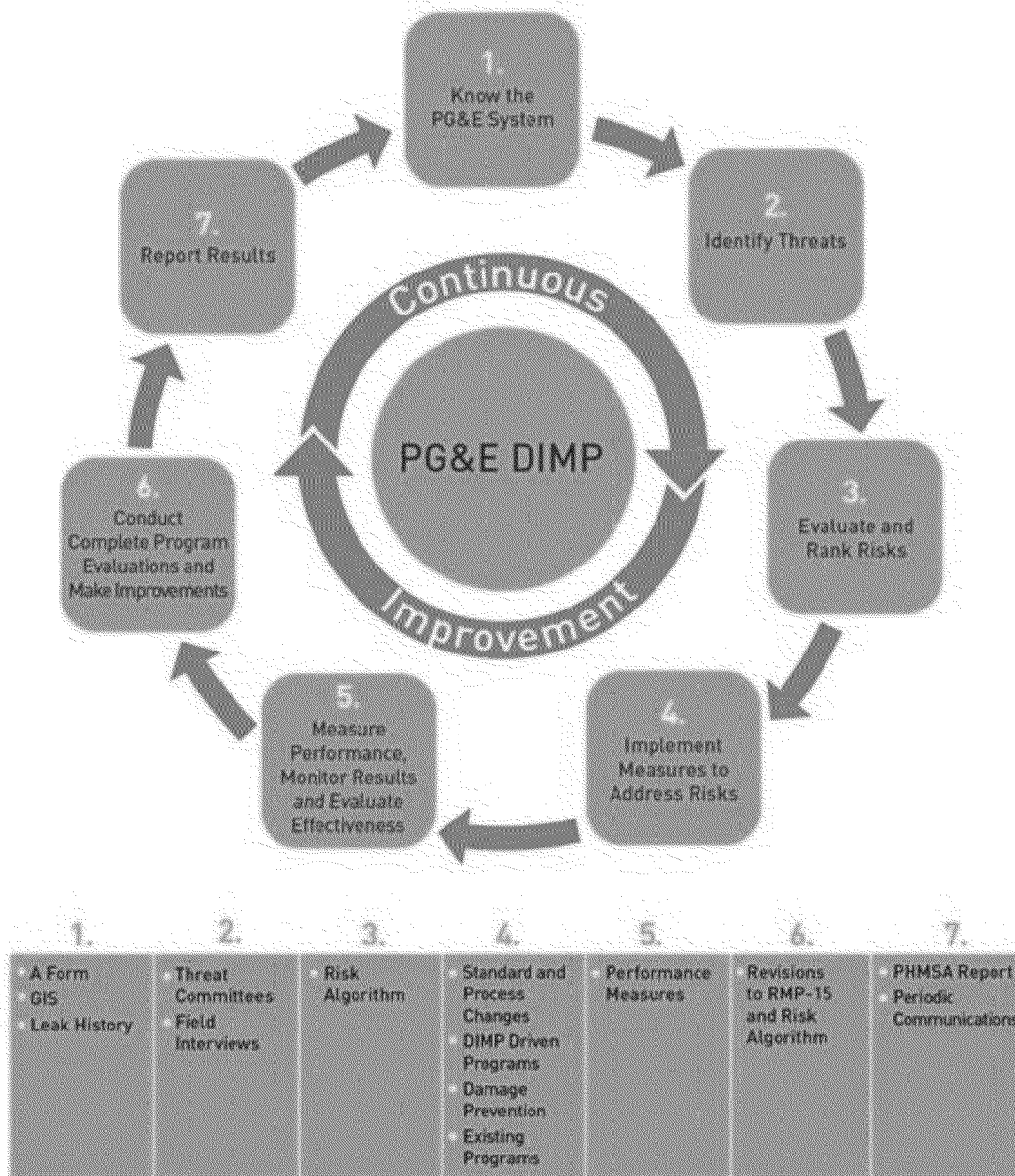


Figure 1: PG&E DIMP Cycle

In addition, PG&E's Distribution Integrity Management Program will be re-evaluated on a five year cycle, as outlined in Section 9.7.

1.4 Distribution Integrity Management Program Ownership

The DIMP Sponsor is responsible for the implementation of this program.



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Minor program changes that do not require changes to RMP-15 may be implemented upon the authorization of the DIMP Sponsor. Any change to the program that requires changes to RMP-15 may be implemented upon recommendation from the managers of DIMP Risk or DIMP Mitigation, with the concurrence of the Director of Distribution Integrity Management and the Vice President and Managing Director of the Law Department and approval by the Vice President of Asset Integrity Management. RMP-15 will be reviewed and updated annually. Changes to RMP-15 are tracked using the change log found in Section 14. Updated versions of RMP-15 will be stored in the ICAM system and the master version of RMP-15 will be stored on the DIMP shared drive. As new versions of RMP-15 are uploaded into ICAM, version control is maintained automatically in ICAM.

1.5 Supporting Documents

1.5.1 Risk Management Instructions (RMIs)

Risk Management Instructions (RMIs) supplement procedures and provide detailed guidance on methods of meeting procedural requirements. RMIs are not meant to document the only acceptable method of meeting procedural requirements nor do they supersede procedural requirements. All new RMIs and changes to existing RMIs must be approved by the Vice President of Asset and Risk Management before implementation. RMIs may be modified and approved separately from RMP-15. The following RMIs are associated with RMP-15:

- RMIB: Performance Measure Reporting
- RMIE: Tangible Property List Data Extraction Procedure
- RMIH: DIMP Field Review Process

1.5.2 Attachments

Attachments are supplementary documents that are part of RMP-15, but are intended to be "living" documents updated on a regular cycle. Updates to these documents do not require the concurrence and approvals outlined in Section 1.4 above. The following attachments are associated with RMP-15:

- Attachment A: Programs & Activities to Address Risk (PAAR)
- Attachment B: Distribution Risk Evaluation (risk ranking)
- Attachment C: DIMP Data Matrix
- Attachment D: ICAM Process & Task Procedures
- Attachment E: DIMP Steering Committee Charter and Roster
- Attachment F: DIMP Documentation and Archives
- Attachment G: Monitoring for Potential Threats
- Attachment H: Known Threat Identification and Known and Potential Threat Risk Evaluation
- Attachment I: Issue Investigation Procedure
- Attachment J: Leak Repair Data Reformatting and Scrubbing Process

1.5.3 Related Guidance Documents

Related guidance documents are PG&E documents that directly relate to or support the Distribution Integrity Management Program. Updates to these documents do not require the concurrence and approvals outlined in Section 1.4 above. They are approved in accordance with the requirements for guidance documents.



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1.6 Definitions and Abbreviations

A-Form – PG&E Leak Repair, Inspection, and Gas Quarterly Incident Report form

Above Ground Facility – Distribution asset located above ground level (e.g. riser, meter set)

Accelerated Action – Programs or actions utilized to manage, reduce or eliminate risk posed by a threat.

Area – A geographical segment on which any programs and activities to address risk may be effectively implemented for any specified threat.

Cause – Method of failure for a leak that has already occurred.

Code – Code of Federal Regulations (CFR) 49, Part 192 Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards.

Consequence of Failure – Outcome of a failure event on life or property; this is a factor in risk ranking based on a point system defined by the DIMPRisk and verified by the DIMP Steering Committee.

DIMP – Distribution Integrity Management Program; a program developed to execute an effective distribution integrity management plan, in compliance with 49 CFR Part 192 Subpart P.

DIMPCycle – One calendar year

DIMPTeam – Combination of DIMPRisk, DIMPMitigation and DIMPEngineering teams.

Distribution > 60 psig – Distribution main operating over 60 pounds per square inch (psig), a subset of Distribution Pipe.

Distribution Pipe – All pipeline systems operating at 60 psig or less and any pipelines determined by Transmission Integrity Management to be outside the scope of TIMP.

ECTS – Enterprise Compliance Tracking System; system used by Regulatory Compliance

GEMS – Gas and Electric Mapping System.

Hazardous Leak – Leak that represents an existing or probable hazard to persons or property requiring immediate repair or continuous action until conditions are no longer hazardous (PG&E classifies these as Grade 1 leaks).

Known Threat – A threat that has resulted in a leak on the system.

ICAM – Web-based quality management platform developed by PI Confluence to manage, schedule, track, document, communicate and report the implementation of the activities associated with the Distribution Integrity Management Program

IIP – Incident Investigation Procedure

Leak Cluster – Spatial representation of repaired and open leaks that form a cluster. Each leak has a 100' radius buffer and where the buffers touch a cluster is formed.

Leak Grade – A classification of a leak based on leak readings, public exposure, and location as follows:

Grade 1 – A leak that represents an existing or probable hazard to persons or property requiring immediate repair or continuous action until conditions are no longer hazardous.

Grade 2+ – Any leak that falls below the Grade 1 leak criteria and above the Grade 2 leak criteria: A leak that is not hazardous to life or property, but requires a priority, scheduled repair based on a probable future hazard or requirements to meet the construction schedule of others.

Grade 2 – A leak that is not hazardous to life or property at the time of detection, but requires scheduled repair based on a probable future hazard.

Grade 3 – Any reading of less than 100% lower explosive limit (LEL) (5% gas in air, 50,000 ppm) in a Class 3 or 4 location that is in a well-ventilated area, such as a pipeline



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right-of-way, station yard, or a non-wall-to-wall paved area, which does not otherwise qualify as a Grade 1, Priority Grade 2, or Grade 2 leak.

Grade 0 - Identified leak that was not found in subsequent leak surveys and regraded. Refer to S4110, Leak Survey and Repair of Gas Transmission and Distribution Facilities, for more information and associated guidance documents.

Likelihood of Failure – Numerical likelihood of each recorded distribution system failure (leak) based on historical leak data.

Main – Distribution pipe operating at less than 60 psig carrying natural gas from Transmission pipe to Distribution services, subset of Distribution Pipe.

Material – Type of material from which the distribution pipe is made (e.g., steel, cast iron, plastic); also a component used in identifying known threats.

PAAR – Programs and Activities to Address Risk

Potential Threat – A threat to a system component or system process that has not yet resulted in a leak.

RCA – Root cause analysis

Repaired Leak – Identified leak that has been repaired and is not subject to subsequent leak surveys.

Risk – Numerical value calculated by multiplying the Likelihood of Failure by Consequence of Failure (LoF x CoF)

RM – Risk Management

RMI – Risk Management Instruction

RMP – Risk Management Plan

SC – Steering Committee

Service – Distribution pipe carrying natural gas from Distribution main to an individual customer.

SME – Subject Matter Expert

Sub-Threat – Categories listed under the “Cause” section of the leak repair form.

Temporary Gas Distribution GIS – A Geographical Information System (GIS) used to store and analyze data related to PG&E’s gas distribution system in a geographical manner.

Data is added to this system as needed to better understand and evaluate risk to PG&E’s gas distribution system. This temporary platform will be in place until PG&E completes its new gas distribution GIS.

Threat – One of the eight Code-defined leak threats (Corrosion, Natural Force, Excavation, Other Outside Force, Equipment, Material or Weld, Incorrect Operation, and Other)

Threat on Facility – Unique combination of Threat, Line Use, and Leak Source used to identify areas of risk for RCA.

TIMP – Transmission Integrity Management Program

2. COVERED FACILITIES

The Distribution Integrity Management Program applies to all gas distribution facilities operated by the Company. It does not apply to facilities used for gas gathering or gas transmission. PG&E defines its Distribution facilities as follows:

All pipeline systems operating at 60 psig or less and any pipelines determined by Transmission Integrity Management to be outside the scope of TIMP.

¹ TD-4110P-09: Leak Grading and Response



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Additional covered facilities include gas distribution main systems and services including: pipelines, pits and vaults, meter sets, regulators, farm taps, valves, fittings (socket fusion fittings, electrofusion fittings), excess flow valves, service tees, tracer wire, external heaters and corrosion control facilities (including rectifiers, anode beds, ETS, monitoring points, rectifier cable, anodes).

3. ROLES AND RESPONSIBILITIES

Establishing and defining the roles and responsibilities of DIMP activities and staff is necessary for a successful DIMP cycle. This section provides overall roles and responsibilities of DIMP activities and tasks, the organizational structure, and an outline of external contractors and vendors who support DIMP programs and activities.

Table 3.1 – DIMP Roles and Responsibilities

Role	Titles	Activities	DIMP Tasks
DIMP Mitigation	<ul style="list-style-type: none"> • Manager DIMP Mitigation • DIMP Engineers • Contract and Consultant Support as needed 	<ul style="list-style-type: none"> • Identify and analyze threat data • Interpret risk model • Conduct RCA • Develop mitigation recommendations • Manage any DIMP assigned programs • Industry/Technology research and outreach • RMP and RMI Updates • Ensure DIMP participation in CPUC and PHMSA Annual Reports • Evaluate performance measures • Collect and Report performance measures • Contract execution and management 	<ul style="list-style-type: none"> • Identify and Implement Measures to Address Risk • Measure Performance and Monitor Results • Periodic Evaluation of Program for Improvement
DIMP Risk	<ul style="list-style-type: none"> • Manager DIMP Risk • Risk Engineers • Gas Technicians • Contract and Consultant Support as needed 	<ul style="list-style-type: none"> • Develop, update, and publish risk model • Conduct risk ranking • GIS data Management • Risk Model Documentation • Develop and review threat identification processes and procedures • Develop and implement DIMP Questionnaire and Field Interviews • Industry/Technology research and outreach • Ensure Communication Plan is implemented • Contract execution and management 	<ul style="list-style-type: none"> • Threat Identification Process • Risk Evaluation and Ranking • Reporting
DIMP Engineering	<ul style="list-style-type: none"> • Manager DIMP Engineering • Engineers 	<ul style="list-style-type: none"> • Process data and consult for RCA • Collect and report data for performance measures • Manage and consult on risk mitigation programs 	<ul style="list-style-type: none"> • Potential threat review
DIMP Steering Committee (SC)	See Current Roster in Attachment E.	<ul style="list-style-type: none"> • Review threat identification processes and procedures • Assess threat data • Validate risk algorithm output • Review recommended program/process mitigation measures 	<ul style="list-style-type: none"> • Periodic Evaluation of Programs for Improvement



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Role	Titles	Activities	DIMP Tasks
		<ul style="list-style-type: none"> Review threat performance measure data Review of FieldReview output Ensure threat communication is integrated across PG&E. Documentation of SC meetings. 	
DIMP Sponsor	Director of DIMP	<ul style="list-style-type: none"> Responsible for implementation and continuous improvement of DIMP Program Provide direction and oversight to personnel conducting IM Program process. Budget management and tracking of DIMP funding Assign the SC Chair and members 	Approval of root cause analyses and recommended PAAR
DIMP Champion	Senior Director Integrity Management	<ul style="list-style-type: none"> Oversee the Distribution Integrity Management program and advocate for the program to drive system-wide execution and results. 	None

3.1 DIMP Steering Committee

The purpose of the DIMP SC is to consistently provide threat identification validation and assessment for both known and potential threats on PG&E’s pipeline system. The DIMP SC will be a resource for DIMP Risk and DIMP Mitigation by reviewing results of key DIMP work products process. See Attachment E, Section 3.0 for more information regarding DIMP SC responsibilities.

3.2 DIMP Contractors

PG&E utilizes a variety of experienced contractors and consultants to help execute activities and programs within DIMP. The table below identifies vendors and their main responsibilities:

Table 3.2 – DIMP Contractor Roles and Responsibilities

DIMP Program Activity	Tasks	Program/Activity Facilitator
Cross Bore Program	Inspection of sewer laterals, overall program management	Frontline Energy Services
DIMP Leak Survey	Creation of DIMP Leak Survey Packages	Alisto Engineering
DIMP Quality Management Implementation tool	Document and Manage DIMP cycle processes	ICAM- PI Confluence

3.3 DIMP Structure

The DIMP organizational structure can be found using PG&E’s electronic organization chart, “Who’s Who” by entering the name of the current VP of Asset and Risk Management into the search engine.

4. KNOWLEDGE OF THE SYSTEM



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4.1 Scope

This section describes how PG&E identifies, gathers, and analyzes system information that is used to identify threats to the system and to select appropriate mitigation actions.

4.2 Introduction

System knowledge is the core foundation of the Distribution Integrity Management Program and improves the overall safety and reliability of the distribution pipeline system. This knowledge is utilized in identifying threats, analyzing risk and implementing measures to address risk. This knowledge is based on an understanding of the system attributes, including materials, construction methods, operating and maintenance conditions, leaks, and other relevant environmental and operating factors.

4.3 Methodology

PG&E utilizes the following processes to identify, gather, and review the data necessary for its DIMP program. The primary data sources gathered and reviewed for threat identification and risk evaluation are the Integrated Gas Information System (IGIS) and RiskMaster.

4.4 Data Source Identification

At the beginning of each DIMP cycle, the DIMP Mitigation and Risk review the data sources outlined below for inclusion in the DIMP processes. Consideration is given to information gained from the data of past design, operations, and maintenance as well as knowledge from the DIMP Steering Committee and SMEs.

Each data source utilized to identify threats and evaluate risk is validated by assessing the following information:

- Type of data (e.g. pipe diameter, material, pressure, location, environmental, etc.)
- Format of data (paper or electronic)
- Use and relevancy of risk model
- Frequency of update
- Completeness of data
- Quality of data (are there QC processes at the source of the data)

4.4.1 Data Sources

Attachment C, "DIMP Data Matrix," documents data sources available for use in threat identification, risk assessment, root cause analysis, programs and activities to address risk, and performance measurement.

4.4.2 Specific Data Sources

The Company utilizes historic leak data for threat identification and risk evaluation processes due to the nature of the relative risk approach and the format in which the leak data is managed. The primary source of data for threat identification and risk evaluation is IGIS or SAP. RiskMaster is used as the primary source for calculating code-based performance measures related to excavation damage and for injury, fatality and damage information.



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4.4.2.1 GIS (Integrated Gas Information System)

Pipeline leak data is documented on the leak repair and inspection form (A-Form) and subsequently input into GIS. GIS is the data source for information on operation, design, and environmental data. It is currently maintained in an electronic format and incorporated into the temporary gas distribution Geographic Information System (GIS). All data stored in GIS is retained for the life of the gas distribution facility. DIMP Risk utilizes a subset of GIS data fields to support threat identification and risk analysis. These required data fields include:

- Leak ID (Leak Number)
- Leak Location (including Division, District, and City)
- Line Use
- Leak Grade
- Reported Leak Cause
- Leak Source
- Material of Leaking Component
- Line Pressure
- Line Outside Diameter
- Surface Over Pipe
- Repair Date
- Report Date
- Proximity to Areas of Public Assembly
- Wall to Wall Paving
- Above Ground Facility

Additional data processing by DIMP Risk is typically required for this data source. The criteria used to scrub the data are documented in Attachment J: Leak Repair Data Reformatting and Scrub Process. If the primary sources for required fields do not contain the data, secondary sources are identified to fill the missing data.

Supplementary data fields that are not required to be extracted from GIS for use in identifying threats or calculating risk, but may be used during root cause analysis include:

- Map Number
- Plat Number
- Block Number
- CP Area
- Year Constructed
- Year Leak was Reported
- USA Information
- Year Main Constructed
- Excavation Type
- Party Performing Work
- Latitude
- Longitude



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4.4.2.2 RiskMaster

RiskMaster is a database that integrates excavation damaged data from sources such as USA tickets and dig-in incident reports (A1-Form). Information in this data source includes operational and environmental data and is currently maintained in an electronic format. Required RiskMaster data utilized by DIMP for identifying threats and reporting requirements includes:

- Dig-In Date
- One Call Ticket Information
- Employee & Other Injury
- Employee & Other Fatality
- Damage Cost

Supplementary data fields that are not required to be extracted from RiskMaster for use in identifying threats or calculating risk, but may be used during root cause analysis include:

- Dig-In Location
- Dig-In Responsible Party
- USA Information
- Damage Cause by Description

For root cause analysis (RCA) and evaluating DIMP program and activity effectiveness, PG&E utilizes, where necessary, additional data sources outlined in Attachment C – DIMP Data Matrix, along with input from subject matter experts and the DIMP Steering Committee (DIMP SC).

4.5 Additional System Knowledge

PG&E collects additional information about the gas distribution system that would not otherwise be identified in analyzing leak data as well as data to be utilized during root cause analysis. The following are methods utilized to collect information from past design, operations, and maintenance practices:

4.5.1. DIMP Field Review

The DIMP Field Review is a process involving a series of comprehensive meetings during which known and potential threats are identified and discussed at the Division level. The first part of the process is a high-level discussion with personnel at the local Division office. During the discussion the DIMP team shares information about the Integrity Management Program and solicits information from local personnel regarding the health of the distribution system in their Division. The second part of the process is designed to focus on those specific concerns raised during the initial meeting to gain a clear understanding of those concerns and issues. The Field Review process is currently executed on a three-year cycle. The DIMP Mitigation and Risk teams will utilize the information gained from the Field Reviews to address any immediate concerns or threats and annually update the risk algorithm to better risk rank the Company's assets. Identified issues will be reviewed by the DIMP Steering Committee for resolution.



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Another function of the DIMPField Review is to validate the ranking of leak counts. During the initial meeting with Division personnel, DIMPRisk presents dashboards showing the number of leaks repaired in the Division in the current cycle categorized by threat. Based on their experience repairing leaks, the Division personnel will provide feedback on the results of the leak data analysis. DIMPRisk will utilize information collected during the Field Reviews to resolve data issues.

A more detailed description of the DIMPField Review process is included in RMI-H, "DIMPField Review Process."

4.5.2. As-Built Plans

PG&E's Cross Bore Program is reviewing job files (as-builts) and gas service records (GSRs) to collect information on installation methods used to install gas mains and services. During this process, other information is being collected and data verification is being performed by the Cross Bore Program (refer to the Cross Bore documentation for more details). All information collected during the data capture is being stored in the gas distribution temporary GIS. The information being collected includes:

- Main and service material
- Installation method (HDD, insert, direct bury, piercing tool)
- Outside diameter
- Length of main and service installed
- Spatial placement

4.5.3. GEMSnap/Plat Sheet

PG&E utilizes GEMSnap to capture additional information about the gas distribution system. PG&E's standards regarding the SynerGEE data models do not require the mapping of gas systems that serve 500 customers or less. The DIMPRisk team is filling the information gap using the temporary GIS to document gas systems that serve 500 customers or less. The data being captured in this review is:

- Job Number
- Year installed
- Material
- Outside diameter
- Coating (if available)

In addition to using the GEMSnap, PG&E has collected and mapped in the temporary GIS potential Aldyl-A mains and services. PG&E is using the information gathered for Aldyl-A for replacement programs. The GEMSnap were used to gather information such as:

- Job Number
- Year installed
- Outside diameter
- Service order number
- Length of main and service installed
- Spatial placement



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4.6 New Pipeline Construction Data

As part of PG&E's DIMP program, the DIMPRisk team collects and retains information pertaining to all new pipeline construction, including location, installation year, material type, diameter, footage, and Job number. The following Company standards describe the current procedures for design, construction, recording and retention of newly installed, replaced and repaired pipeline and pipeline facilities.

Utility Operations Standard S0470, "Design and Construction of Gas Distribution Facilities" establishes or references minimum design and building process steps that must be accomplished by the design, construction, inspection, documentation and mapping and maintenance groups.

Utility Operations Standard S5458, "Gas Service Records" establishes a uniform procedure for using and filing Gas Service Record forms. The forms provide information for the initial construction and subsequent modification of gas services. Each gas service, stub, or branch will be recorded on a Gas Service Record form and posted on the gas plat sheet. When new pipelines are installed or modified, the engineering estimator is responsible for completing the Gas Service Record form. The M&C crew foreman completes the form and ensures that all field information is correct and complete. The crew foreman also provides as-built changes to the job sketch to help clarify field information. The form is sent to the Gas Mapping department where the mapper updates the distribution plat sheet and enters the data into the Tangible Property List (TPL) entry system and files the service record.

Gas Service Records are the documents of record and are maintained by the Mapping organization. The Gas Service Records reflect the spatial location of services, outside diameter, material, job number, cathodic protection (CP) system, installation method and other components in PG&E's gas distribution system.

TPL/Franchise Reporting System User Guide establishes the procedure for inputting as-built data in the Tangible Property List. The data within TPL may be queried for attributes of abandoned, replaced, and newly installed distribution mains and services. Pertinent information includes location, installation year, material type, diameter, footage and a Job/Service number which can be used to find additional documents related to the asset.

For more information about the data extraction process, refer to RMIE, Tangible Property List Data Extraction Procedure.

Distribution and Customer Service Standard D-S0457, "Gas Mapping Standard, 1" = 100' Plat Sheets" establishes uniform methods and procedures for making and maintaining gas distribution maps.

Plat sheets are summary documents that are maintained by the Mapping organization. The plat sheets reflect the spatial location of mains and services, outside diameter, material, job number, cathodic protection (CP) system, and other components in PG&E's gas distribution system.



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5. THREAT IDENTIFICATION PROCESS

5.1 Scope

This section outlines the process that PG&E uses to identify known and potential threats to the integrity of the gas distribution system.

5.2 Methodology

The Known Threat Identification process utilizes leak repair data, which is annually reviewed and scrubbed according to Attachment J: Leak Repair Data Reformatting and Scrub Process. Data scrubbing is critical in producing consistent and actionable data. Leaks are reviewed and mapped to one of the 8 threat categories and the results reviewed for quality and importance. The identified known threats are approved by the DIMPSC.

Potential threats are identified by continuously monitoring data sources independent from leak repair data. This includes reviewing internal, industry and government data sources to generate a potential threat list which is annually reviewed and evaluated for risk. The identified potential threat list, its validity and any action is reviewed and approved by the DIMPSC.

5.2.1. Known Threat Methodology

PG&E groups threats into eight general categories in alignment with the reporting requirements outlined in 49 CFR Part 192 Subpart P. All eight primary threats listed below are considered system-wide threats:

- 1) Corrosion
- 2) Natural Forces
- 3) Excavation
- 4) Other Outside Forces
- 5) Material or Welds
- 6) Equipment Failure
- 7) Incorrect Operations
- 8) Other

Known threats to PG&E systems are identified through analysis of Threats, Line Uses, and Leak Sources. PG&E utilizes a database to manage threat data.

Attachment H: Known Threat Identification and Known and Potential Threat Risk Evaluation, describes the known threat identification procedure.

5.2.2. Known Sub Threat Identification Process

PG&E defines known sub threats on facilities as combinations of sub threats and facilities. These sub threats are identified on the A-Form as cause descriptions and are used by the DIMP Mitigation team for root cause analysis (RCA) and to determine appropriate mitigative actions. Sub threats are specific descriptions of the eight main known threats identified during leak repairs and include the following:



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Table 5.1 Known Threats and Their Sub-Threats

Corrosion	Excavation	Other Outside Forces	Natural Forces	Equipment	Material or Weld	Incorrect Operations	Other
External Corrosion	Dig-In/Excavation	Vehicle	Earth Movement	Equipment Malfunction	Cast Iron Fracture	Incorrect Operation	Other
Internal Corrosion	Previously Damaged	Electrical Facility	Heavy Rains/Floods	Construction Defect	Plastic Crack Failure		No/Deteriorated Pipe Dope
Atmospheric Corrosion	Third Party	Deliberate Acts/Vandalism	Earthquake		Plastic Embrittlement		Unknown
		Fire or Explosion on Company Facility	Lightning		Material Failure		
		Fire or Explosion on Customer Facility	Root Damage		Weld Failure		
		Rodent	Other Natural Forces		Compression Coupling		
		Third Party			Construction Defect		
		Previously Damaged			Cracking		

5.2.3. Interactive Threats

PG&E defines interactive threats as failure mechanisms acting upon resident features. Resident features may include equipment, materials, fittings, valves, regulators, risers, and pipeline lifespan. Pipeline lifespan contributes to resident features with situations such as inactive corrosion or non-leaking third party damage. Failure mechanisms considered include corrosion, excavation, natural forces, other outside forces and incorrect operations. Further study on this will be completed by the Interstate Natural Gas Association of America in conjunction with the American Society of Mechanical Engineers and PG&E's processes for considering interactive threats will be updated as appropriate.

5.2.4. Potential Threat Identification Process

Potential threats are defined as threats that are not leaking and are discovered through field experience, non-leaking incident investigations, internal SMEs, National Transportation Safety Board (NTSB) Reports, Pipeline and Hazardous Materials Safety Administration (PHMSA) Advisory Bulletins or other industry reports. Specific details can be found in Attachment G: Monitoring for Potential Threats and Attachment I, Issue Investigation Procedure. Action is taken on potential threats depending on the risk level. Potential threats are annually reviewed by the DIMPSC to insure proper



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classification and action has been taken to address risk. The following is the process PG&E uses for potential threat identification:

- 1) Data Collection
 - Potential threats are collected by DIMPEngineering and DIMPRisk from:
 - PHMSA Advisory Bulletins
 - NTSB incident reports
 - Field Review processes
 - Material Problem Reports
 - Corrective Action Program notifications
- 2) Potential Threat Categorization
 - The list of potential threats is reviewed by the DIMPRisk team for applicability to PG&E's Distribution assets and qualitatively risk ranked. Potential threats requiring mitigation are addressed by DIMPMitigation. Potential threats not requiring mitigation are documented and reviewed annually.
- 3) Potential Threat Validation
 - A list of potential threats is generated for review and approval by the DIMP SC. The DIMPSC confirms that appropriate action has been taken.

6. RISK EVALUATION AND RANKING OF THREATS

6.1 Scope

This section describes how PG&E evaluates and ranks risk. Known threats to the distribution system are evaluated as part of the risk assessment process for PG&E's distribution facilities.

6.2 Methodology

Through the risk evaluation and ranking process, the Company determines the relative importance of each threat and establishes a ranking of the risks posed to its distribution facilities, which are validated by the DIMPSC. The risk approach uses a relative risk algorithm to assign a risk score to each leak event, which is further described in section 6.4

The risk scores of leaks are aggregated and analyzed at the appropriate geographic level. Geographic areas with elevated risk and unfavorable performance are selected for root cause analysis. Attachment H: Known Threat Identification and Known and Potential Threat Risk Evaluation, describes the risk evaluation procedure.

After consideration of all available data, the components of risk that were included utilized the following data inputs:

1. Probability – the number of leaks associated with any specific threat on facility defined as a combination of threat and facility.
2. Impact on Life – whether the leak was near public, resulted in an injury or death and/or was associated with any damages. The latter two aspects relate to reportable incidents.
3. Consequence Potential – based on the environmental factors including wall to wall, type of surface, proximity to structures and whether it was above ground.
4. Leak Magnitude – pressure, grade, and diameter



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5. Injury / Fatality Statistics – these statistics collected by PHMSA (1992-2011) act as a multiplier that adjusts the consequence of each threat based on the associated injuries and fatalities.

PG&E currently evaluates the risk of potential threats qualitatively to determine if action is required to mitigate the threat. This process includes understanding the history of the threat PG&E's service territory, identifying the potential scope of the threat (e.g. population of a specific asset type in PG&E's system or geographic areas potentially affected) and engaging SMEs to understand the relevance of the threat and the potential risk to PG&E's system. Based on this information, DIMPRisk determines the risk of the threat relative to other potential threats.

6.3 Risk Model Review

Prior to initiating risk calculations and rankings, the DIMPRisk team reviews the risk model with the DIMPSC. During this review, the team considers all lessons learned in the previous cycle with regard to the risk model and consequence value assignment. The team revises the risk model accordingly for the subsequent risk evaluation.

6.4 Risk Evaluation

The risk value incorporates Likelihood of Failure (LoF) and Consequence of Failure (CoF) by threat with the following formula:

$$R_T = \sum_{i=1}^n (LoF_i \cdot CoF_i)$$

Where,

R_T: Total risk per threat

n: Number of leak events

LoF_i: Likelihood of each recorded leak event (equal to 1)

CoF_i: Consequence of each leak event

Threats to the system are identified using all repaired leak data (Grades 1, 2+, 2 and 3), which is collected in accordance with PG&E's Gas Standard S4110– Leak Survey and Repair of Gas Transmission and Distribution Facilities. As shown in the equation above, the total consequence associated with each threat is the sum of the applicable leak consequence scores. The components of consequence are assigned points and in the case of missing data, default values are assigned. The point values are determined by the DIMPRisk team and verified by the DIMPSC. Default values are typically the conservative, maximum value. Data missing consistently can cause leak aggregations to rank incorrectly due to default point values. A sensitivity analysis is used on default values and missing data during the scrub procedure in Attachment J: Leak Repair Data Reformatting and Scrubbing Process, and Attachment H: Known Threat Identification and Known and Potential Threat Risk Evaluation, to insure they that default values do not have an impact the aggregate score on the risk ranking.

6.5 Consequence of Failure (CoF)

The consequence portion of the risk model is based on components of Impact on Life, Consequence Potential, Leak Magnitude, and Injury / Fatality statistics. The variables of each component are identified and the relative severity of a variable's points determines the



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contribution to the consequence of a leak. The leak dataset (IGIS) described in System Knowledge includes a number of attributes associated with each leak that are utilized as variables. Additional definitions for each attribute and its values can be found in TD-4110P-03-JA01, A-Form Instructions. These variables are grouped into components as shown in the equation for CoF:

$$\text{CoF} = [(\text{Impact on Life}) + (\text{Consequence Potential})] * [(\text{Leak Magnitude}) * (\text{Injury Fatality})]$$

Where,

Impact on Life factors are:

- Near public
- Injury
- Fatality
- Damage

Consequence Potential factors are:

- Wall to Wall paving
- Surface
- Proximity

Leak Magnitude factors are:

- Pipeline Pressure
- Pipeline Diameter
- Leak Grade

Injury Fatality factors are:

- Injury Fatality metric
- Injury Fatality ratio

The following attributes are utilized to derive the consequence associated with the leak event.

6.5.1 Impact on Life – whether the leak was near public, resulted in an injury or death or, was associated with any damages.

Near Public: Indicates if leak was within 100 feet of a public assembly area (e.g. school, hospital, church, or daycare center). Leaks near public areas have a higher consequence as a result of the potential for people to be near a pipe in the event of an incident.

Factor	Points
No	0
Yes	5
*Default, if unknown	5

Other Injury: Number of non-employee injuries.

Factor	Points
0	0
1 or more	25
*Default, if unknown	0

Employee Injury: Number of employee injuries.



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Factor	Points
0	0
1 or more	25
*Default, if unknown	0

Other Fatality: Number of non-employee fatalities.

Factor	Points
0	0
1 or more	50
*Default, if unknown	0

Employee Fatality: Number of employee fatalities.

Factor	Points
0	0
1 or more	50
*Default, if unknown	0

Damage: Amount of repair cost plus lost gas. The dollar value of a repair was used as an indicator of the scope of damage as a result of a leak. Higher dollar values indicate not only larger monetary consequences, but also the potential effect on human life. \$50,000 in damage is a threshold for a CPU reportable event.

Factor	Points
>\$0 to \$50,000	5
>\$50,000	10
*Default, if unknown	5

6.5.2 Consequence Potential – based on the environmental factors including wall to wall, type of surface, and proximity to structures.

Wall to Wall: Indicates if pipe is under continuous paving from main to building wall. Such paving may allow leaking gas to migrate into a nearby structure.

Factor	Points
No	0
Yes	5
*Default, if unknown	5

Surface: Type of cover above the pipe segment. Surfaces such as cement or asphalt will allow for the migration of gas under the surface and result in higher consequences.

Factor	Points
Above Ground	5
Exposed Facility	5
Water/Marsh/Tidal	5
Soil – Previously Unsurfaced	0
Other	15
Asphalt	20
Concrete	25
In Substructure	30
*Default, if Unknown	30

Proximity: Proximity to structures influences the migration and accumulation of leaking gas within a structure. Leaks from Above Ground Facilities may escape to



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atmosphere, whereas leaks from Services have higher accumulation potential than leaks from mains.

Factor	Points
Above Ground Facilities	5
Mains	10
Services	15
Distribution above 60 psig	10
*Default, if unknown	15

6.5.3 Leak Magnitude – pressure, grade, and diameter
Pressure: Indicates pressure class of the system. Leaks of higher pressure systems will result in a higher released gas volume and flow rate and potentially affect a large area.

Factor	Points
Low Pressure	5
Semi-High Pressure	10
High Pressure	15
Distribution above 60 psig	20
*Default, if unknown	20

Grade: There are four leak grade designations: 1, 2+, 2, and 3. Grade 1 leaks are defined as hazardous; therefore, they carry the highest consequence points. Lower grades are considered potentially hazardous and non-hazardous and carry lower points.

Factor	Points
Grade 1	45
Grade 2+	15
Grade 2	5
Grade 3	1
*Default, if unknown	45

Diameter: Larger diameter piping may release larger volumes of gas in the event of a leak resulting in potentially higher consequences.

Factor	Points
<= 1"	5
>1" to 2"	10
>2" to 4"	15
>4" to 6"	20
>6" to 8"	25
>8" to 10"	30
> 10"	35
*Default, if unknown	35

6.5.4 Injury / Fatality Statistics – these statistics collected by PHMSA (1992-2011) act as a multiplier that adjusts the consequence of each threat based on the associated injuries and fatalities.

Sub-threats for each primary threat can be found in section 5.2.2 of this document.



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Injury Fatality Metric: The points indicate a relative ranking of the primary threats resulting in injury or fatality based on the total nationally reported injuries and fatalities.

Factor	Points
Excavation	35
Other	30
Other Outside Force	25
Natural Force	20
Incorrect Operations	15
Material or Weld	10
Equipment	10
Corrosion	5
*Default, if unknown	35

Injury Fatality Ratio: The fatality-to-injury ratio associated with each threat. This indicates the historical incidents of fatalities versus injuries when a leak results one of the primary threats.

Factor	Ratios
Other Outside Force	0.35
Other	0.35
Excavation	0.28
Natural Force	0.23
Corrosion	0.17
Material or Weld	0.09
Equipment	0.09
Incorrect Operations	0.06
*Default, if Unknown	0.35

6.6 Determining Areas of Risk

When the risk rankings are validated by the DIMPSC, areas of risk are identified by applying distribution bands across the risk ranking to delineate areas of low, medium, and high risk. Geographic areas for risk aggregation are chosen depending on the type of threat. DIMPRisk reviews the risk data to determine the most appropriate method (e.g. standard deviations, confidence levels, etc) to identify areas for root cause analysis. The methodology approved annually by the DIMPSC and is documented in Attachment B: Distribution Risk Evaluation. Currently, DIMP analyzes risk at the appropriate level for each threat to insure that a disproportionate threat does not mask threats in another category due to quantity or circumstances. Separation can include geographic areas, line use and leak source and is evaluated annually. Distribution pipe above 60 psig is aggregated separately from risk below 60 psig.

There are four risk aggregations generated:

1. Excavation Threat – City and Line Use level
2. Other Threat – District, Line Use, Leak Source level
3. All Threats except Excavation and Other – District, Line Use, Leak Source level
4. All threats – line use, leak sources for distribution pipes operating above 60 psig.

The statistical methods used to identify areas of high or medium risk and are annually reviewed and approved by the DIMPSC.



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6.7 Determining Areas for Root Causes Analysis

The combination of risk and system performance will determine if root cause analysis is needed. PG&E performs RCA in cases as shown in the following table:

Table 6.1 –Risk & Performance

		Performance		
		Good	Fair	Poor
Risk	Low	Review Next DIMP Cycle	Review Next DIMP Cycle	Review Next DIMP Cycle
	Medium	Review Next DIMP Cycle	Review Next DIMP Cycle	Perform RCA
	High	Review Next DIMP Cycle	Perform RCA	Perform RCA

As described in Section 6.6, the DIMPRisk team uses standard deviations to define distribution bands in determining geographic areas of low, medium, or high risk. System performance is identified based on a five-year linear trend of leak repairs for the same geographic area for each threat and is annually reviewed by the DIMPSC. Good performance is indicated by a decreasing 5-year linear trend. Fair performance is indicated by a flat (slope equals zero) 5-year linear trend. Poor performance is indicated by an increasing 5-year linear trend. All distribution pipes operating above 60 psig have RCA performed regardless of performance.

6.8 Process Validation

The DIMPSteering Committee with the assistance of the DIMPRisk and DIMPMitigation teams will review the risk factors used in the calculation (LOF/COF), the risk ranking results and performance results. This validation will also include a comparison to previous years. Based on any changes to or updates for the risk ranking review and risk value review, the relative risk algorithm maybe adjusted by DIMPRisk as necessary and documented.

7. IDENTIFY AND IMPLEMENT MEASURES TO ADDRESS RISK

7.1 Scope

This section describes PG&E's programs and activities to mitigate risk, including an effective leak management program, the RCA process and the process to update or create programs and activities.

7.2 Introduction

Risk can be managed or eliminated by reducing the number of leaks or by mitigating the consequence. PG&E implements actions and develops risk management programs designed to reduce risks associated with its identified threats to its gas distribution system.

Attachment A: Programs and Activities to Address Risk (PAAR), covers the programs that PG&E's Distribution Integrity Management Program has initiated to manage known risks to the gas distribution system.

7.3 Methodology

The areas recommended for root cause analysis are reviewed by DIMPMitigation. DIMP Mitigation combines similar root cause analyses based on the type of risk identified.



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During an RCA, DIMP mitigation may work with SMEs, local engineering, field personnel, DIMP Risk or asset and program owners. The steps of an RCA include: data gathering, data analysis, geospatial analysis and development of PAARs. Additional data is gathered and processed as necessary. Each completed root cause and its associated PAARs are approved by the DIMPSC and the analysis is approved by the DIMP Director.

Issues, including Potential Threats are documented and analyzed via Attachment I: Issue Investigation Procedure.

7.4 Current Programs.

The following are descriptions of programs developed by PG&E prior to the formal Distribution Integrity Management implementation in 2011. These programs were developed as a result of other leak management and damage prevention requirements as well as needs identified internally by PG&E. These programs are reviewed during the RCA process to determine if they can be used to implement PAARs without new program creation.

7.4.1. Leak Management Program

One of PG&E's key integrity management processes is its Leak Management Program. The process is documented in S4110 Leak Survey and Repair of Gas Transmission and Distribution Facilities. The objective of the program is to inspect for possible gas leakage in any area where PG&E gas facilities exist, and to respond appropriately when a gas leak is identified, suspected, or reported. PG&E regularly reviews the existing leak management program to ensure its effectiveness. The primary focus of this process is to minimize risks to public, employees, the environment, and property.

Following is a brief description of the current Leak Management program.

7.4.1.1 Locate

Geographic areas are broken down by whether the lines are located inside or outside of business districts. Whether or not a line is located in a "business district", as set forth in 49 C.F.R. 192.723 defines the various frequencies in which surveys are conducted. Leak surveys are conducted at regular intervals throughout the distribution systems. PG&E's policy is to search for, evaluate, and control gas leakage at various frequencies in the interests of safety and efficiency of operation. These surveys are completed on foot, with mobile units, and by air when appropriate.

7.4.1.2 Evaluate & Act Appropriately

Once a leak is identified, its severity is classified or "graded" based on leak readings, public exposure and location. Based on this information, the appropriate response time and action is applied. Leak Survey Supervisors and construction forces are actively involved in the identification, tracking, response and resolution of each leak until it is eliminated.

7.4.1.3 Keep Records

Records of these leaks are established immediately upon detection and updated through the final repair of the leak. PG&E's integrated IGIS captures and tracks these records for trending and evaluation and the records are retained indefinitely.



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7.4.1.4 Self-Assess

A portion of the self-assessment process includes conducting incident investigations for significant leak events tracked in Gas Events, such as dig-ins and reportable incidents. The goal is to learn from leak incidents by providing a process and format for analyzing these incidents and communicating the findings to the rest of the organization. DIMPEngineering monitors metrics and trends for leak survey and leak repair.

7.4.2. Damage Prevention Program

PG&E's damage prevention program addresses the risk to PG&E's system associated with excavation damage. The key components of the program include:

- Public Awareness— educate excavators and the general public about pipeline safety and safe digging procedures.
- Locate and Mark— ensure PG&E facilities are accurately located prior to excavation damage.
- Damage Investigation – conduct thorough investigations of dig-ins to understand root cause of damage.

The Damage Prevention team monitors metrics and identifies and addresses trends.

7.4.3. Other Programs

In addition to its leak management and damage prevention programs, PG&E and DIMP has implemented other programs to address risks on its gas distribution system outside of the DIMP cycle and PAARs. PAARs utilize these existing programs to address risk identified through RCA. Some examples of programs are listed below:

- Aldyl-A Replacement Program— replacement of high risk Aldyl-A
- Gas Pipeline Replacement Program (GPRP)— replacement of high risk cast iron and pre-1940 steel
- Copper Services Replacement Program (CSRP)— replacement of all copper services
- DIMP Leak Survey – identification of groupings of historical leaks for additional leak survey and asset replacement
- High Pressure Regulator Program (HPR)— replacement of targeted HPRs
- Meter Protection Program (MPP)— protection of meters from vehicular damage
- Cross Bore Program— inspection of sewer mains and laterals for unintentional boring of gas facilities through sewers
- Atmospheric Corrosion Inspection Program— inspection of meters for evidence of atmospheric corrosion
- Isolated Steel Services Program— inspection of sample of isolated steel services for adequate cathodic protection
- Excess Flow Valve Program— installation of excess flow valves according to code

7.5 DIMP Programs and Activities to Address Risk (PAAR)

Programs and activities to address risk (PAAR) were developed as a result of analysis performed as part of the Distribution Integrity Management Program. See Attachment A for a complete list of these DIMP-driven programs and activities to address risk.



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7.6 DIMPEngineering

Somemitigation activities are identified and managedby DIMPEngineering groups. While under the overall umbrella of Distribution Integrity Management,these mitigation measures are managedseparately due to:

- Minimal activity and resources required
- Risk reduction not realized in the near term
- Efforts are incorporated into existing projects

DIMPMitigation is kept apprised of these activities through SMEnput and ongoing interaction between the teams. As these mitigation activities develop, they maybe formally incorporated into the Distribution Integrity ManagemenProgram for documentation and effectiveness tracking.

7.7 Issue Investigation Procedure (IIP)

The Issue Investigation Procedure (IIP) provides a framework for topics that require assessmentoutside of the quantitative risk assessmentmethod. This includes identifying and assessing potential threats, knownthreats that require heightened monitoring, individual incidents and distribution systems requiring special assessment. The IIP utilizes data gathered by Attachment G: Monitoring for Potential Threats Process. PAARscan be created via this process. IIPs are reviewed by the DIMPSCannually. For a more detailed description please refer to Attachment I: Issue Investigation Procedure.

7.8 Root CauseAnalysis

RCAsare broken into the following steps:

- 1) Internal Review and Data Gathering
- 2) Data Analysis
- 3) Geospatial Analysis
- 4) Results Validation
 - a. SMEnput
 - b. Field Input
 - c. DocumentReview
- 5) PAARDevelopment
- 6) RCADocumentation
- 7) DIMPSteering Committee Approval
- 8) DIMPDirector Approval
- 9) Communication
- 10) PAARnitiation

The list of areas for RCAsis reviewed by DIMPMitigation. Each area is analyzed independently (steps 1-5), but RCAdocumentation and PAARs(steps 6-10) can cover RCAs in multiple geographic areas. RCAdocumentation and PAARsare documentedwith a unique number to enable tracking.

7.9 Determine Mitigation Measures

The DIMPMitigation team considers all current and applicable mitigation measuresand will first leverage those prior to developing new mitigation measures. During this review the DIMF Mitigation team will identify new mitigation measuresor changes to the program that would increase its effectiveness in reducing risk.



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If during their review, the DIMPMitigation team is unable to identify current programs or activities designed to mitigate specific threats, the team will work to develop a new program or activity to mitigate risk.

The DIMPSteering Committee will review all mitigation recommendations from DIMPMitigation and provide feedback for program improvements.

8. MEASUREMENT PERFORMANCE AND MONITORING RESULTS

8.1 Scope

PG&E has identified a number of performance metrics that will be measured, monitored and utilized in the determination of effectiveness. These performance metrics include:

1. Reportable performance measures
2. Collected performance measures
3. System performance measures
4. Performance measures associated with the results of the various PAAR

Each of these performance measures will be reviewed / utilized in different places in the annual DIMP cycle.

8.2 Baseline

The DIMPRisk team reviewed statistics and historical information on leak survey frequency and chose 2010 as the baseline year. In reviewing historical leak data, the Risk team discovered that PG&E experienced a much higher than normal number of leaks in 2009. This increase in repaired leaks was related to the implementation of a new leak survey training program and an accelerated leak survey of PG&E's gas distribution system. Since 2009 leak data did not represent a typical year in terms of leak survey or number of leaks, and since PG&E improved its implementation of a consistent leak grading policy in 2009, PG&E selected leak data from 2010 for its baseline. Baseline data for excavation damage and all internally-driven programs and activities to address risk were also set at 2010 in order to be consistent with the code-required leak data baseline.

8.3 Alternate Baseline

Based on when specific programs or projects begin, 2010 data for some baseline metrics is not available. PG&E anticipates that new threats will be identified as part of the annual DIMP cycle and thus more programs will be developed to mitigate these new threats to the distribution system. When a new program is created, PG&E will use data from the RCA that created the PAAR to establish a baseline.

8.4 Reportable Performance Measures & Collected Performance Measures

After consideration of all available data, information from the IGIS and Risk Master data sources were utilized to represent performance.

Based on the requirements further described in Section 12.2 of this document, PG&E submits the following performance measures on an annual basis:

- Number of hazardous leaks eliminated and hazardous leaks repaired categorized by threat



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- Number of excavation damages
- Number of excavation tickets received by gas department
- Total number of leaks eliminated and leaks repaired categorized by threat

Additionally, the following performance measure is collected annually although not required to be reported.

- Number of hazardous leaks eliminated and hazardous leaks repaired categorized by material.

8.5 PAAR Performance Measures

Each PAAR has associated performance measures as detailed in Attachment A. It is the responsibility of each PAAR owner to collect and maintain these performance measures. For each program developed as a result of prior DIM analyses (all programs included in Attachment A), the DIM mitigation team will collect the performance measure data from each PAAR owner for use in the root cause analyses following the annual identification of the areas with high risk threats and their associated system performance. Changing a performance measure requires approval of the DIMPSC and DIMP Director.

9. PROGRAM EVALUATION AND CONTINUOUS IMPROVEMENT

9.1 Scope

This section describes how PG&E's Distribution Integrity Management Program and related RMIs, processes and mitigation programs will be evaluated for quality assurance, performance management and continuous improvement. In accordance with the program evaluation requirements outlined in 192.1007(f), PG&E performs reviews and evaluations including the following:

- Threats / Risk / Performance
- Programs and Activities to Address Risk (PAAR)
- Quality Assurance Audits
- RMP-15 Reevaluation
- External Regulatory Audits
- Program Administration

9.2 Programs and Activities to Address Risk Evaluation by DIM Mitigation (ANNUAL)

As discussed previously in this Plan, as part of the root cause analysis process, DIM Mitigation reviews all programs and activities to address risk (PAAR) to evaluate their performance. The DIM mitigation team will annually collect performance measurement updates for all programs developed as a result of DIM analyses. See Attachment A: Programs and Activities to Address Risk (PAAR) for a complete list of all programs that have been developed as a result of DIM analyses. The DIM mitigation team will then review the program performance measure to determine if the programs are performing well, fairly, or poorly. When DIM mitigation identifies programs or activities that are performing poorly, the team notifies the appropriate Program/Process Owner for further analysis. The DIMPSC will annually review and approve the results of the performance measures.

9.3 Section Intentionally Left Blank

9.4 RMP-15 Review (Annual)



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On an annual basis, the DIMPMitigation team will review RMP-15. This review will take place at the end of each annual DIMPCycle. The objective of this review is to determine if changes are required based on the results of the completed DIMPCycle. If changes are required, then the plan will be reauthorized as outlined in Section 1. These annual reviews include both RMP-15 and all supporting documents.

9.5 RMP-15 Reauthorization (Five Years)

At a minimum, a 5-year reevaluation of the elements of RMP-15 must be completed. The DIMPRisk and DIMPMitigation teams will complete the reevaluation and make necessary changes to the plan. The results produce an approved revision of RMP-15. While this process must be conducted at least every 5 years, it may be done more often to incorporate program improvements, as discussed in Section 9.4 above. RMP-15 reevaluation includes, but is not limited to the following:

- Roles & Responsibilities
- Workflows & Process Methodologies
- Reporting criteria
- Definitions
- Data sources/Information Systems
- Communication Plans
- Contact Information
- Documentation

9.6 External Regulatory Audits (as Scheduled)

PG&E shall undertake external audits as determined by PHMSA and CPUC. The external audit will review PG&E's DIMP activities and written plan for regulatory compliance. Any corrective actions from external audits will be documented and tracked through completion using the ECTS Regulatory Compliance tracking process.

9.7 Program Administration (Five Years)

PG&E will perform an evaluation of its Distribution Integrity Management Program every five years to determine if the processes, activities, and programs are effective in achieving the overall objectives of the program. Effectiveness is the performance of programs and PAARs in reducing leaks and risk. The following documents are the major contributors to the Program and will be evaluated:

- RMP-15
- RMP Attachments
- RMIs
- White Papers
- Issue Investigation Program Results
- PAAR Performance Measures
- Code Required Performance Measures

The effectiveness results will be used to determine the types of improvements to the Distribution Integrity Management Program.



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10. MANAGEMENT CHANGE

10.1 Scope

This section describes procedures for proposing, approving and documenting changes to RMP-15 and related RMIs.

10.2 Management of Change Process

The processes for communication and management of change are as follows:

1. Document control – Any amendments or modifications to RMP-15 are to be approved by the Vice President of Asset and Risk Management. The copy of the current version of RMP-15 will be stored in the Technical Documents Library and the master copy will be stored on the Integrity Management shared drive.
2. Future Changes – RMP-15 is intended to be a living document. Changes are expected and encouraged to promote continual improvement of the overall program. Section 14, Change Log, will be used to document changes made to RMP-15. The RMP Change Form includes the following information:
 - The section changed
 - A summary of the change
 - The reason for the change
 - The change implications.

10.3 External Communication Regarding Program Change

Changes to the DIMP will be communicated to the CPU as part of the annual report outlined in Section 12.6. The DIMP Sponsor will notify Regulatory Compliance regarding the reporting requirement.

11. INTERNAL DIMP COMMUNICATION PLAN

11.1 Scope

This section describes PG&E's internal DIMP communication plan, which is designed to keep appropriate PG&E management, steering committees, and gas operations personnel informed about the Company's Distribution Integrity Management Program.

11.2 Methodology

Communications shall be conducted as indicated in the table below to ensure that appropriate individuals and authorities have current information about the Company's distribution pipeline system and distribution integrity management efforts. Communication documentation will be documented and stored on local shared drives. See section 13.4. Documentation Collection & Archiving Procedures, for more details.

11.3 DIMP Communications

The following table outlines the details of the communication plan for a calendar year.



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Table 11.1 – DIMP Communications

Communicator	Audience	DIMP Message	Frequency
DIMP Sponsor	Gas Operations Leadership Team	Status report providing a summary of the annual DIMP Cycle findings and top risks identified.	Annually
DIMP Risk or DIMP Mitigation	M&C Distribution Directors and Superintendents	Status report providing details of the DIMP findings and top risks identified in each Division.	Annually
DIMP Risk or DIMP Mitigation	Gas Distribution Engineering and Design	Attend meeting to provide updates on DIMP and collect feedback from senior engineers. Provide Status report providing details of DIMP findings and top risks identified in each Division.	Annually

12. REPORTS TO GOVERNMENT AGENCIES

12.1 Scope

This section outlines PG&E's process for submitting reports to PHMSA and to the CPUC in compliance with 49 CFR Part 191 and CPUC GO-112-E.

12.2 PHMSA 7100.1-1 (Annual Report Form)

On an annual basis, PG&E completes PHMSA 7100.1-1 as outlined in Utility Procedure TD-4413P-03 "Annual and Quarterly Reporting Requirements for Gas Incidents, Events and Activities" and submits the form through PHMSA's online portal no later than March 15 each year. In addition, PG&E provides a copy of PHMSA 7100.1-1 to the CPUC with a report outlining the major mitigation programs and accomplishments of the program during the previous year.

12.3 PHMSA 7100.1-2 (Mechanical Fitting Failure Report Form)

The Company completes PHMSA 7100.1-2 as outlined in TD-4413P-03 and submits the form through PHMSA's online portal no later than March 15th each year. Please refer to RMI-B: Performance Measures Reporting, for details on collecting the information required.

12.4 Intentionally Left Blank

12.5 Intentionally Left Blank

12.6 DIMP Plan Updates

Changes to the DIMP plan (RMP-15) will be communicated to the CPUC by the Regulatory Compliance organization, by March 15 of each year. The contact information for the CPUC is shown below.

Mr. Michael Robertson
Gas Safety and Reliability Branch
Consumer Protection and Safety Division
California Public Utilities Commission
320 West 4th Street, Suite 500
Los Angeles, CA 90013



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13. RECORD RETENTION

13.1 Scope

This section describes the Company's policy and procedures for retaining records and supporting documentation associated with the Distribution Integrity Management Program

13.2 Identified Records & Retention Timeframe

All records and other documentation that demonstrate compliance with the requirements of Subpart P, including system knowledge data, threat identification and risk evaluation results, and DIM Program and activity performance measure data, must be kept for a minimum of 10 years. Maintaining static views of data will allow the DIM Risk team to recreate risk evaluations in subsequent cycles. The Distribution Integrity Management group will retain copy of records as necessary to comply with this requirement. These records include, but are not limited to, the following sources:

- RMP-15 and related RMs, whitepapers, attachments, and appendix items (includes historical versions of RMP-15)
- DIM Steering Committee notes
- DIM Field Review meeting notes
- Data used for threat and risk analysis as well as regulatory reporting, including IGIS data
- Data used for root cause analysis
- Annual risk evaluation results

13.3 Documentation Collection & Archiving Procedures

The master documents for DIM will be located on PG&E shared drives and SharePoint. See Attachment F: DIM Documentation and Archives, for the locations of documentation associated with DIM.

14. CHANGELOG

Section	NOI/Action to be Taken	Change	Reason for Change	Implication of Change
Throughout Document		Changed "Threat Steering Committee" to "Steering Committee." Changed TSC to SC. Referred to a single committee and Chair rather than multiple Committees and Chairs.	To be consistent with the Integrity Management Steering Committee. Additionally having "Threat" in the name implies the DIMPSC only handles "Threats" when the SC has a broader scope. Related to NOI 4.2	Greater consistency in terminology.
Throughout Document		Updated roles, changing DIM Administrator to DIM Sponsor; DIM Engineering to DIM Mitigation; Asset Engineering to DIM Engineering	Organizational changes	DIM Administrator and DIM Sponsor role has been merged.
Throughout Document		Removed references to IMSC	IMSC responsibilities have been incorporated into TIMP and DIMPSC responsibilities.	Increased efficiency when establishing or modifying SCs, with new controls added.
Throughout Document		Made threat, cause and threat on facility consistent to the	Increased consistency in the language regarding threat	Results in a consistency change for RMP-15



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Section	NOV/Action to be Taken	Change	Reason for Change	Implication of Change
		listed definition throughout RMP-15.	and cause	attachments and RMI's.
Throughout document		Removed process diagrams through document, inserted text describing process flows	Process maps removed due to changes in program structure regarding ICAM use.	ICAM review no longer required to determine if complies with the process maps.
Throughout Document		Changed "root cause analysis (RCA)" to read RCA.	Document consistency.	None.
Throughout Document		Added a 3 rd digit to section numbers in certain sections	Provide more clarity and reference locations.	None.
1.1		Added language regarding activity tracking method utilizing SAP	Add flexibility for activity tracking method to enable migration to the company platform of SAP	Processes currently tracked in ICAM will be migrated to SAP.
1.5.2		Deleted section documenting the change log as a separate appendix. Approval requirements governed directly by RMP-15 instead of referenced. Re-numbered section to address deletion.	Avoid confusion between "Appendix" and "Attachment" which have different levels approval required. Fewer documents to maintain.	Change log incorporated into the body of RMP-15. of
1.5.3		Updated attachment list	Account for new attachments	None.
1.6		Added the definition of Cause, IIP, RM, SC, and Sub-Threat, Potential Threat, Known Threat Updated definition for distribution pipe	RMP-15 lacked these definitions Reflects TAMP requirements allowing for changes.	Results in consistency verification for RMP-15 attachments and RMI's. None
1. 6		Added definition of known and potential threat	Potential threats not included in Definitions and Abbreviations.	None.
Table 3.1	NOV 4.2 Update RMP-15 to specify in one location all the responsibilities for review of DIMPCycle activities.	Moved responsibilities of the IMSC to the DIMPSC and referenced the DIMPSC Charter.	Address NOV 4.2.	None.
3.1	NOV 4.2 Update RMP-15 to specify in one location all the responsibilities for review of DIMPCycle activities.	Updated description of DIMP Steering Committee and added reference to Attachment E.	Address NOV 4.2.	None.
3.2		Updated DIMP Contractors list	Removed contractors no longer working for DIMP	None.
3.3		Removed DIMP organizational chart. Included a reference to Who's Who and Table 3 for specific roles, titles and responsibilities.	To remove the need to update the organizational chart when the structure changes. - Reference SAP Who's Who documentation for current org structure.	New reference must satisfy the CPUC audit protocol.
4.4.2	NOV 3.1 Revise RMP-15, section 4.4 to identify the Injury, Fatality, and Damage as required fields for Riskmaster and not for IGIS NOV 1.1 Update Leak Repair Data Reformatting and Scrub Procedure to	New introduction paragraph, referring to changes regarding data sources in Riskmaster Changed the primary source for required fields: Injury, Fatality, and Damage from IGIS to Riskmaster Language regarding primary and secondary data sources added.	Language clarified to reference NOV 3.1. Address NOV 3.1. It was identified the primary source for consequence data should be Riskmaster. Address NOV 1.1 and improve process clarity. Default values are part of the	None. None. None.



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Section	NOV/Action to be Taken	Change	Reason for Change	Implication of Change
	identify secondary data sources and a process to follow if data is unavailable.	Language regarding default values removed and added into Section 6.4	risk assessment and not the data scrubbing process.	None.
5.2.2		Updated sub threats to align with Scrub Process	The sub threats in RMP-15 were not consistent with the Scrub Process.	None.
Table 5.1		Added a table name.	To be consistent throughout RMP-15.	None.
5.2.4	NOV 2.1 Develop a new Attachment G to RMP-15 to document the process for identifying and risk ranking potential threats.	Describe monitoring of potential threats. Removed language referencing Bulletin 316.	Added references to Attachment G and I, and language providing a process overview. Bulletin 316 has been canceled. Alt G performs this monitoring function.	None. New process developed to monitor federal communications.
6.2		Delete definition of potential threats as this is covered in 5.2.4 Added reference to new Attachment H.	Reduce redundant language. New process that needed to be referenced in the body of RMP-15.	None. None.
6.3	NOV 4.1 Update RMP-15 to remove section 9.2 and update sections 5 and 6 to incorporate detailed process on annual review of threat identification and risk ranking.	Added DIMPSC requirements for the Risk Model Review.	The requirements were removed from 9.2.	
6.4	NOV 1.1 Update Leak Repair Data Reformatting and Scrub Procedure to identify secondary data sources and a process to follow if data is unavailable. NOV 1.2 Incorporate risk results sensitivity analysis into risk assessment and PCA identification process.	Language regarding default values added, having been removed from Section 5. Language on subdivision of risk removed. Language added to describe sensitivity analysis.	Default values are applied necessary during the risk assessment process, not the scrub process. Addresses NOV 1.1. Covered in Section 6.6 where the topic is addressed in detail. Document action in Attachment H. Addresses NOV 1.2.	Improved process clarity. Improved process clarity.
6.5	AOC 2.3 Update RMP-15 section 6.5 to provide a reference to TD-4110P-03-JA01 for definitions of consequence factors.	Inserted reference to TD-4110P-03-JA01. Added language on default values. Re-arranged formula definitions Above Ground factor removed Removed "Potential" from Impact on Life Potential	Address AOC 2.3. Reference should accompany the description of consequence factors. Further clarified the use of default values and how the process utilizes them Formula definitions were not listed in the same order as their occurrence in the risk formula. Above ground information is contained in section "Surface" Language consistency	None. None. None. Double counting of above ground data attributes removed. None.
Original 6.6 moved to 6.8		Relocated Process Validation step to 6.8 from prior 6.6	More accurately describes risk evaluation process flow.	None.
6.6,	NOV 3.2 Revise RMP-15 section 6.7 to clarify	Clarified how risk is determined in 6.6 and the	Addresses NOV 3.2, 3.3 and 3.4. Clarification between a	No significant implications at 5



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Section	NO/Action to be Taken	Change	Reason for Change	Implication of Change
	how PG&E determines areas of risk. NO/ 3.3 Revise RMP-15 section 7.7 to clarify the meaning of performance as used in the Risk and Performance cross matrix. NO/ 3.4 Increase risk result detail down to the district level (completed and is being implemented as part of the current 2013 DIMP cycle).	meaning of system performance measure. Removed part of section 6.6 that discussed PAAR performance. Added language regarding >20%SMY transmission pipe.	year system performance compared to a PAAR performance. Clarified to better match work flows. Address how it is special handled during risk ranking to insure an RCA is performed.	
6.7 and 7.7.1		Moved the description of good, fair, and poor system performance from original 7.7.1 to 6.7. Language clarified	Section moved to better match work flows. Various minor edits to improve clarity.	None. None.
6.8		Added language requiring review of performance as well as risk output. Removed second paragraph	Insure that performance is reviewed to address how current or past practices impact the trend. Paragraph contained no information that was not in the paragraph above.	Additional validation component. None.
7.4	AOC 3.1 PG&E will revise RMP-15 section 7.8 to more clearly state that all programs will be considered during the identification of mitigation measures.	Renamed title to Current Programs Changed name of program from Leak Clusters to DIMP Leak Survey Added language regarding how the programs are used within an RCA	Clarify difference between PAAR and current programs Updated to current program name Address AOC 3.1	None. None. None.
7.7	NO/ 2.1 Develop a new Attachment G to RMP-15 to document the process for identifying and risk ranking potential threats.	Added section on Issue Investigation Procedure	Needed description of how new IIP can result in mitigation activities and how IIP addresses potential threats. Address NO/ 2.1.	IIP is another process for generating mitigation activities.
7.8		Added RCA process outline Documented combining of RCA white papers.	Needed more detail as to the steps that were required within an RCA. RCAs and PAARs frequently have the same outcome across multiple geographic areas, allowing the use of combined RCA white papers and PAARs.	Improved process clarity. Fewer, more lengthy RCA white papers.
7.8.1		Removed "Internal Review" section	Covered within the RCA process	
7.8.2		Removed "Field Communication" section	Covered within the RCA process	
7.8.3		Removed "Data Analysis" section	Covered within the RCA process	
7.9	AOC 3.1 PG&E will revise RMP-15 section 7.8 to more clearly state that all programs	Changed verbiage to indicate PG&E will use existing mitigation measures first prior to developing new measures.	Address AOC 3.1.	Results in a consistency verification in Attachment E.



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Section	NO/ Action to be Taken	Change	Reason for Change	Implication of Change
	will be considered during the identification of mitigation measures.			
8.3		Allowed DIM mitigation to utilize leak and risk data from within the FCA scope to establish the PAAR baseline, removing year of PAAR establishment as the baseline.	Simplification of baseline creation	Enables baseline to be set with increased flexibility and ties baseline to period analyzed.
8.5 (deleted)		Deleted section on System Performance metrics	This is part of the FCA selection process and already described in section 6.7.	None.
8.5 (new)		Allowed the change of a performance measure with a high level of approval required.	Performance measures can require changes to accurately measure a PAAR's performance.	Performance measures can be altered with approval.
9.2	NO/ 4.1 Update RMP-15 to remove section 9.2 and update sections 5 and 6 to incorporate detailed process on annual review of threat identification and risk ranking.	Removed section 9.2.	NO/ 4.1. Clarifies the focus of section 9 to annual and 5 year evaluations, removing threat review language. Section 5.2 addresses annual review of threat identification processes. Sections 6.3 and 6.6 address annual review of risk evaluation processes. Section 6.7 addresses annual review of performance trending methodology.	None.
9.2 (New)		Removed "prior to FCA" language and inserted annual requirement. Added requirement for DIMP SC to review PAAR performance	Provide flexibility to when performance measures are gathered. Program performance is a significant program step and needs to be validated to insure programs are working	Increased flexibility. Additional meetings of DIMP SC required.
9.3		Deleted section.	QA procedures and requirements now addressed under new company standards : Gas Operations Audition Standard, TD-4023S Gas Operations Auditing, Annual Audit Schedule, TD-4023P-01 Gas Operations Audition Procedure, TD-4023-02 RISK-6301S and RISK-6301P-02	Independent controls have been strengthened.
9.7 (previously 9.8)	NO/ 4.3 Update RMP-15 Section 9.8 to list out documents used in review to measure the overall program effectiveness and describe how the results of performance monitoring in RMP-15	Listed documents to be reviewed during 5 year review plan and indicated how the program results will used to determine the types of improvements to the distribution integrity management program	Address NO/ 4.3.	None.



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Section	NOV/Action to be Taken	Change	Reason for Change	Implication of Change
	Section 8 are used in the review.			
10.2		Change Log reference is now Section 14, not Appendix A Update VP title Added the Technical Information Library as a place RMP-15 is stored.	Updated reference Organizational changes Make RMP-15 available throughout the company.	None. None. None.
11.3		Remove GasCAP attendance requirement Changed attendance requirements for local engineer's meetings from bi-monthly to annually, added presenting DIMResults Removed DIMPMonthly Meetings and replaced with annual communications. Updates completed to identify the audiences and messages required for the DIMP communications.	Removed due to lack consistently actionable data and to increase efficiency. Needed new communication channel for DIMResults with local engineering Annual program milestones were not frequent enough to necessitate monthly status meetings with field employees and were replaced with annual communications focusing on risk and program findings Simplification of communications	Method of communication removed. Increased focus on the intent of the communication. Increased focus on the intent of the communication. Increased the communication recipient scope.
12.4		Removed "Gas Quarterly Incident (GQI) Reports" section.	Performed outside of DIMP.	
12.5		Removed "Gas Events Reporting" section.	Replaced by Corrective Action Program (CAP).	
14		Moved RMP-15 Change Log from Appendix A to a newly created section of RMP. Appendix A	Avoid confusion between "Attachment A" and "Appendix A"	No significant implications
RMI-F		Document canceled. References removed throughout document.	Removed due to lack of actionable data from this collection method	Data source removed.
Attachment E	NOV 4.2 Update RMP-15 to specify in one location all the responsibilities for review of DIMPCycle activities.	Verified and added DIMPSC responsibilities mentioned in RMP-15 to Attachment E.	Address NOV 4.2	None.
Attachment E, Table 3.2		Added SMEcolumn	To indicate the SMEthe SC consults on the specified topics	Results in a consistency verification in Attachment E.
Attachment G	NOV 2.1 Develop a new Attachment G to RMP-15 to document the process for identifying and risk ranking potential threats.	New procedure for monitoring potential and monitored threats	Address NOV 2.1	Increases the level of monitoring mitigation for certain threats.
Attachment H	NOV 1.2 Incorporate risk results sensitivity analysis into risk assessment and RCA identification process. NOV 2.1 Incorporate risk results sensitivity analysis into risk assessment and RCA identification process.	Formalized procedure describing known threat identification and risk evaluation	Address NOV 1.2, NOV 2.1, and AOC 2.1	Formalized procedures, including a new risk sensitivity analysis process



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Section	NO/Action to be Taken	Change	Reason for Change	Implication of Change
	AOC 2.1 PG&E will create a new Attachment H to RMP-15 to define the risk calculation process with specific requirement for a review of leaks on distribution facilities operating at greater than 60 psi.			
Attachment I	NO/ 2.1 Develop a new Attachment G to RMP-15 to document the process for identifying and risk ranking potential threats.	New process to manage threat list and help identify potential threats	Address NO/ 2.1. A process was required to assess potential threats and document known threats as necessary.	New method that complements and feeds data into the DIMPCycle
Attachment J		Formalized procedure for leak repair data reformatting and scrub. Added secondary data sources and process for filling in missing primary data sources. Implemented recommendation for downgraded leaks.	Address NO/ 1.3 and AOC 2.2.	Modified scrub procedure.