PACIFIC GAS AND ELECTRIC COMPANY

CALIFORNIA GAS TRANSMISSION
GAS SYSTEM MAINTENANCE & TECHNICAL SUPPORT
SYSTEM INTEGRITY SECTION
Risk Management

Procedure for Risk Management
Procedure No. RMP-01
Rev. 0
Risk Management

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Rev. No.	Date	Description	Prepared By	Approved By	Approved Manager, System Integrity
0	See Above	Initial Issue			
1	1-2-03	Revised As Shown			
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4	6-9-05	Revised As Shown			
5	10-31-05	Revised As Shown			

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1.0 PURPOSE

The purpose of this procedure is to provide a process for maintaining California Gas Transmission's (CGT) Risk Management Program (RMP) and complying with the requirements for risk calculations as part CGT's Integrity Management Program (RMP-06).

2.0 SCOPE

This procedure is applicable to all of CGT's gas transmission pipeline facilities, including line pipe and regulating station facilities. At this time, this procedure is not applicable to the following:

- Compressor Station Facilities (other than piping);
- Storage Facilities (other than piping);
- Gas Gathering Facilities.

The Integrity Management Group is responsible for managing risk within the scope of this procedure. The Integrity Management Group shall establish and manage the risk of each pipeline facility by utilizing industry and regulatory accepted methodologies appropriate to PG&E's CGT facilities and shall be in conformance with this procedure. The Integrity Management Program Manager shall be responsible for compliance with this procedure.

Risk information shall be communicated to management and other appropriate CGT personnel for project planning, risk mitigation, inspection planning, and regulatory reporting. Per RMP-06, risk for each pipeline segment shall be calculated annually.

The procedure applies to both covered and non-covered pipe segments as defined in RMP-06. In addition to the requirements specified in this procedure, RMP activities associated with covered pipeline segments must also comply with the requirements of RMP-06.

3.0 INTRODUCTION

The risk management process is a process of calculating risk, developing risk mitigation plans to bring and maintain risk within an acceptable risk profile, and monitoring risk to accommodate changes in the factors that affect risk. PG&E applies this process to all pipelines system-wide and annually considers assessments or mitigation needed to ensure the on-going integrity of all pipelines.

The Integrity Management Program (IMP) is a program established by PG&E to address the integrity management rules in 49 CFR Part 192 Subpart O. Procedure RMP-06 provides an overall description and process for CGT's Integrity Management Program. Since RMP-01 supports the calculation of risk associated with pipelines covered by the IMP, it is referenced by RMP-06.

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RMP-01 is referenced to calculate the overall risk: the combination of the likelihood of failure due to five of the basic pipeline threats (external corrosion, third party, ground movement, and design/materials) and the consequence of failure. Other threats, such as Internal Corrosion (IC) and Stress Corrosion Cracking (SCC), may be added to the procedure in the future if they become more relevant to our pipeline system. IC and SCC likelihoods have not been included at this time because they are only applicable to 12.36 and 4.33 miles of HCA pipe, respectively. Rather than dilute the risk calculation for the remaining 98% of the pipeline system, pipelines with these threats were prioritized as "high risk" and the likelihood factors were not included in the overall risk calculation. See § 9.0 for additional details.

An inventory of all the pipeline design attributes, operating conditions, environment (e.g., structures, faults, etc.), threats to the structural integrity, leak experience, and inspection findings must be developed and maintained. Risk must be calculated based on an inclusive inventory of assembled attributes. The risk values need to be reviewed and criteria for acceptance established. Risk mitigation plans developed, budgeted and completed, and conditions monitored to update criteria, risk values, and mitigation plans, as necessary, to accommodate new information. (New information could include new damage prediction models, changes to population in proximity to a pipeline, changes to system operating characteristics which could affect safety margin, damage accumulation, the number of customers out of service, or gas load; new seismic or environmental hazard identification, inspection findings as they relate to the physical condition of the pipe or the systems needed to protect the pipeline or component from damage or degradation, or changes in the potential for third party damage.)

Because threats to the pipeline and consequences of a failure change over time, the process of monitoring and adjusting risk mitigation plans is an ongoing process. The risk management process is a methodology utilizing pipeline characteristics (physical and environmental), qualitative risk assessment, quantitative risk analysis, and decision-risk analysis methods to determine a cost-effective risk management of CGT's pipeline facilities. The process follows these basic steps:

- Accumulate facility design attributes, existing condition, potential threats, and failure consequences,
- Determine Likelihood of Failure (LOF) for each pipeline segment,
- Determine Consequence of Failure (COF) for each pipeline segment,
- Calculate risk for each pipeline segment based on the Likelihood of Failure and the Consequence of Failure,
- Develop a system wide risk mitigation strategy,
- Propose and prioritize rehabilitation projects or inspections based on the damage mechanism, threat, and risk, and finally,
- Monitor and adjust the process, as necessary, to incorporate changes in technology, changes in information, or changes to code or regulatory requirements.

4.6 Roles and Responsibility

Specific responsibilities for ensuring compliance with this procedure are as follows:

Title	Reports to:	Responsibilities

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Title	Reports to:	Responsibilities
Manager, System Integrity	Director, Gas System Maintenance & Technical Support	• Review and approve procedure • Concur on selection of Steering Committee Chairperson and membership
Integrity Management Program Manager	Manager, System Integrity	• Supervise completion of work (schedule/budget) • Monitor compliance to procedure (take corrective actions as necessary). • Assign qualified individuals • Ensure Training of assigned individuals • Assign Steering Committee Chairperson and members, and ensure that meetings are held once each calendar year.
Steering Committee Chairperson (Risk Management Engineer)	Integrity Management Program Manager (except for TP Steering Committee – that person reports to Manager System Integrity)	• Arrange meetings. • Review procedure with committee per RMP-01 • Provide meeting minutes • Ensures action items are completed.
Steering Committee Members (Subject Matter Experts)	Various	• Attend meetings as requested by Steering Committee Chairman. • Provide review and direction to procedure.
Risk Management Engineers	Integrity Management Program Manager	• Perform calculations per procedure

5.0 Training and Qualifications

See RMP-06 for qualification requirements. Specific training to ensure compliance with this procedure is as follows:

[redacted]

Position	Type of Training	How Often
Integrity Management Program Manager	Procedure review of RMP-01	• Upon initial assignment • Once each calendar year.
Steering Committee Chairperson	Procedure review of RMP-01	• Upon initial assignment • Once each calendar year. • As changes are made to the procedure.
Steering Committee Members (Subject Matter Experts)	Steering Committee requirements of RMP-01.	• Once each calendar year at the time of the steering committee meeting.
Risk Management Engineers	Procedure Review of RMP-01 and RMP-06.	• Upon initial assignment • Once each calendar year. • As changes are made to the procedure.

6.0 RISK DETERMINATION

6.1 RISK shall be defined as the product of the Likelihood of Failure (LOF) and the Consequence of Failure (COF).

$$[RISK = LOF \times COF] \qquad \textit{(Equation 1)}$$

In general, the source of information used to calculate risk shall be obtained from PG&E's Geographical Information System (GIS). Exceptions are noted within RMP procedures. There are also special cases where updated information is made available from other sources (such as from Pipeline Engineers, In-Line-Inspection (ILI) reports, Corrosion Engineers, or District Personnel.).

6.2 CALCULATION METHODOLOGY: A relative risk calculation methodology shall be used to establish risk. Risk will be calculated per this procedure for all pipeline segments within the scope of this procedure. A pipeline segment shall be defined as the length of contiguous pipeline with the same piping specification, class location, and Integrity Management HCA designation. (Pipe segments are as shown in GIS.) The method used to calculate risk shall be based on an index model and qualitative scoring approach. The scoring shall be based on expert direction from appropriately staffed Steering Committees. For each major component of the integrity management program, a Steering Committee shall be established to provide technical review and input to the program. There are currently five committees covering External Corrosion, Third Party damage, Ground Movement, Design/Materials, and Consequence. Requirements for the Steering Committees are as follows:

6.2.1 The Steering Committees shall be comprised of a minimum of five individuals with expertise in the particular subject matter. It is the responsibility of the Integrity Management Program Manager, with the concurrence of the Manager of System Integrity, to select a range of individuals with knowledge and experience on the subject matter for which they are contributing. A list of the current membership shall be documented and included in RMP File 7.4.

6.2.2 For each steering committee, the Integrity Management Program Manager, with the concurrence of the Manager of System Integrity, shall assign a Committee Chairperson. The Chairperson is responsible for scheduling meetings, conducting the meeting in accordance with the requirements of this procedure, preparing meeting minutes, preparing necessary supporting material (risk ranked pipelines and applicable GIS themes) prior to the meeting, and making necessary changes to procedures following the meeting.

6.2.3 The committees shall meet at least once each calendar year to review and approve the methodology used to calculate risk and determine if changes are advisable.

6.2.4. At each meeting or at least each calendar year, the committee shall review the overall process of risk calculations provided by this procedure, the detailed requirements for conducting the meeting as contained in this section of RMP-01 (because the Consequence Steering Committee is responsible for this procedure, the committee will perform a detailed review), and a detailed review of the requirements of the procedure for which they are providing direction.

6.2.5 At each meeting or at least each calendar year, the committee shall review, at a minimum, the ten most highly ranked segments for the threat or consequence for which the committee provides guidance. For the committees that address one of the threats, the review shall at a minimum consider the following:

- The ten pipeline segments with the highest LOFs for the threat,
- The ten pipeline segments with the highest LOF X COF of the threat,
- Ten additional pipeline segments with risk values spread through the range of values
- Performance metrics (such as the number of leaks and applicable characteristics) relevant to procedure . (See RMP-08, Section 10)

For the Consequence Steering Committee, the review shall at a minimum consider:

- The ten pipeline segments with the highest COF,
- The ten pipeline segments with the highest IMA COF,
- The ten pipeline segments with the highest Total Risk
- Ten additional pipeline segments with risk values spread through the range of values
- Performance metrics (such as incidences and applicable characteristics) relevant to the consequence of a failure.

In reviewing each of these segments, the committee shall determine if, in the opinion of the committee, the ranking is appropriate or changes in the risk calculation algorithms is required. Consideration shall be made to the relative ranking of the various components used to calculate risk and the need for inclusion of other important information that may not have been included. The review should also consist of integrating all of the relevant (based on the procedure being evaluated) layers and themes in GIS and reviewing the integrated data (not just aggregating the information in a spreadsheet) in determining the validity of the risk algorithms.

Each steering committee will identify the significant attributes that influence the threat's LOF or COF, as appropriate. For each attribute, a percentage weighting will be established or reviewed to identify the factors' relative significance in determining the threat's LOF or COF. Points will be established based on criteria that the committee feels is significant in determining the threat's LOF or COF and the relative severity of failure (leak-before-break vs. rupture). (Negative points may be assigned where current assessments have been made to confirm pipeline integrity and/or mitigation efforts have eliminated or lowered susceptibility to a threat although the total points for a threat will not be less than zero.) Generally, the summation of the percentage weightings for all of the factors within each threat should be 100%. (There may be exceptions to permit the consideration of very unusual conditions.)

6.3 *__LIKELIHOOD OF FAILURE (LOF)__* is the relative measure of the probability that a pipe will fail. Failure, within the context of this procedure, is the breach of the structural integrity of the pipe. The following threat categories shall be used for calculating risk: External Corrosion (EC), Third Party (TP), Ground Movement (GM) and Design/Materials (DM). (As new credible threats are identified as relevant to the determination the LOF, they will be submitted to the Consequence Steering Committee for inclusion into the risk calculations.) Each threat category shall be weighted in proportion to PG&E and industry failure experience. EC is currently weighted 25%, TP shall be weighted 45%, GM shall be weighted 20%, and DM shall be weighted 10%.

$$LOF = 0.25EC + 0.45TP + 0.20GM + 0.10DM \qquad \text{(Equation 2)}$$

Committees used to review procedures applicable to these threats are as follows:

6.3.1 The algorithm for the threat of External Corrosion (EC) shall be calculated per the direction of the EC Steering Committee as provided in Procedure RMP-02.

6.3.2 The algorithm for the threat of Third Party (TP) shall be calculated per the direction of the TP Steering Committee given in Procedure RMP-03.

6.3.3 The algorithm for the threat of Ground Movement (GM) shall be calculated per the direction of the GM Steering Committee given in Procedure RMP-04.

6.3.4 The algorithm for the threat of Design Materials (DM) shall be calculated per the direction of the DM Steering Committee given in Procedure RMP-05.

[redacted]

6.4 Consequence of a Failure (COF) shall be defined as the sum of the following Consequences Categories: Impact on Population (IOP), Impact on the Environment (IOE), and Impact on Reliability (IOR). Each of the consequence categories shall be weighted in proportion to the perceived impact of a failure. IOP shall be weighted 50%, IOE shall be weighted 10%, and IOR shall be weighted 40%.

COF = [0.50(IOP) + 0.10(IOE) + 0.40(IOR)]FSF *Equation 3*

Where,

IOP = Impact on Population (Section 6.4.1 of this procedure)

IOE = Impact on Environment (Section 6.4.2 of this procedure)

IOR = Impact on Reliability (Section 6.4.3 of this procedure)

FSF = Failure Significance Factor, which represents the relative likelihood of leak rather than rupture and the existence of Wall-to-Wall conditions which would make the consequences of a leak more severe. The FSF will be taken as 0.5 for pipeline where the MOP is at <20% SMYS and Wall-to-Wall paving conditions are verified NOT to exist and 1.0 for pipelines where the MOP is at ≥ 20% SMYS or where Wall-to-Wall paving conditions exist or have not been verified to NOT exist. In addition, the FSF shall not be taken as less than 1.0 where the following conditions exist:

- *Where the pipeline segment is within 300' of a School, Hospital, or Prison Building unless the outside pipe diameter is less than or equal to 4.5"*
- *Where the pipeline segment is within 300' of a switchyard.*
- *Where the pipeline was installed prior to 1947 and is in an area of ground acceleration greater than 0.5g.*
- *Where the pipeline segment was installed prior to 1947 and is in an area of ground acceleration greater than or equal to 0.2g AND is in an area of unstable soil. (Unstable soil, for the purpose of this definition, is categorized as that identified as having High/Moderate potential for liquefaction or High/Mod potential for landslide.)*
- *Where the pipeline segment has a depth of cover of less than or equal to one foot.*
- *Where the pipeline segment has a MOP of greater than 200 psig, has a outside diameter of greater than or equal to 4.5", and is Class 3.*

The weightings on each of the consequence categories will be reviewed and approved by the Consequence Steering Committee. Points will be scored to the consequences as follows:

6.4.1 Impact on Population (IOP) shall be calculated per the direction of the Consequence Steering Committee. The committee has determined that the factors in A through C of this section are significant for determining the

Population impact of a gas pipeline failure. The ICP contribution to COF shall be the summation of assigned points times the assigned weighting for the following factors:

A) Population Density in Proximity to Pipeline (35% Weighting). Points will be awarded as follows:

Criteria	Points	Contrib.
Class 1	10	3.5
Class 2	40	14
Class 3	70	24.5
Class 4	100	35

B) Pipeline proximity[1] to a potential area of population concentration (45% Weighting). Points are additive and will be awarded as follows:

Criteria	Points[5]	Contrib.
Identified Sites[3] that require a Integrity Management Plans. Examples include Hospitals, Schools, Daycare Centers, Retirement Communities, Prisons, Health treatment facilities, and Public Assembly Areas such as stadiums, churches, parks, outdoor theaters, located within the Potential Impact Radius[2]	100	45
Railroads, Rail, and Light Rail Tracks	30	13.5
Highways[4]	40	18
Commercial Airports[6]	50	22.5
No Features	0	0

1. Within [illegible] of pipeline.
2. Potential Impact Radius (PIR) (where $PIR = 0.69(OD^2 \cdot MOP)^{1/2}$ (feet)) of Pipeline centerline.
3. Identified Sites consist of facilities having persons who are confined, are of impaired mobility or would be difficult to evacuate or other identified public assembly areas where 20 or more persons congregate at least 50 days in any 12-month period. A detailed definition is provided in RMP-06.
4. Highways are Class 1, 2, and 3 roads in GIS.
5. Points shall be awarded once per category. (For example, a pipe segment with two adjacent highways would be awarded 40 points.)
6. Airports must have a control tower and commercial or military traffic consisting of 15% or more of the total airport traffic.

C) Potential Impact Radius (PIR) (20% Weighting). Points will be awarded as follows:

$$Points = 1 + 4[0.69(OD^2 \cdot MOP)^{1/2}/(1{,}000)]$$, not to exceed 20

6.4.2 Impact on Environment (IOE) shall be calculated per the direction of the Consequence Steering Committee. The committee has determined that the factors in A and B of this section are significant for determining the environmental impact of a gas pipeline failure. The IOE contribution to COF shall be the summation of the assigned points times the assigned weighting for the following factors:

[redacted]

A) Presence of a Water Crossing (20% Weighting). Points will be awarded as follows:

Criteria	Points	Contrib.
Presence of Water Crossing	100	20
No Water Crossing	0	0

B) Passing through or adjacent* to an Environmentally Sensitive Area (80% Weighting). Points will be awarded as follows:

Criteria	Points	Contrib.
State or National Park	70	56
Wildlife Reserve	70	56
Navigable Waterway	90	72
Other Protected Area	70	56
No Environmentally Sensitive Area	0	0

* Within 300 Yards or PIR, (where PIR = [illegible]) [illegible] Pipeline centerline, whichever is greater and unless otherwise noted.

6.4.3 Impact on Reliability (IOR) shall be calculated per the direction of the Consequence Steering Committee. The committee has determined that the factors in A though D of this section are significant for determining the reliability impact of a gas pipeline failure. The IOR contribution to COF shall be the summation of the assigned points times the assigned weighting for the following factors:

A) Reliability Impact on Customers served by CGT in the event of a pipe failure (30% Weighting). Points will be awarded for gas load[1] as follows:

Points = 10 + (Gas Load[1]/500), not to exceed 100
Unknown Gas Load = 20.

[1] Gas Load (MCF/Day) is the higher of a Average Summer Day (ASD) or a Average Winter Day (AWD) as provided by Transmission System Planning. It does not include an Abnormal Peak Day (APD).

B) Number of Customers[2] to experience a gas service outage (35% Weighting). Points will be awarded as follows:

Points = 10 + (Customer Outages[2]/100), not to exceed 100.
Unknown Gas Load = 20.

[2] The number of customer outages is provided by Transmission System Planning.

[redacted]

C) Proximity of Critical Facilities (10% Weighting): Points will be awarded as follows:

Criteria	Points	Contrib.
Liquid Fuel Pipelines[1]	100	10
Other Gas Pipelines[2]	80	8
Electric Transmission Lines[1]	80	8
No Critical Facilities	0	0

[1] Within 30 Meters of Gas Pipeline

[2] Within 10 Meters of Gas Pipeline.

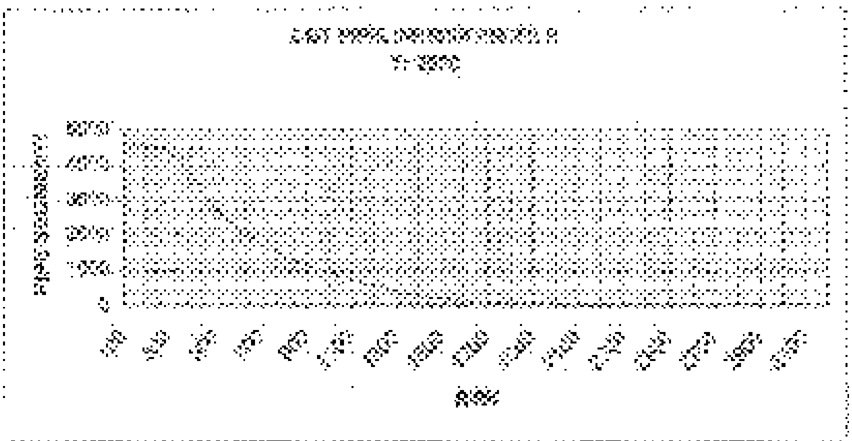
[3] The distances in footnotes 1 and 2 shown above may be adjusted as appropriate to reflect conditions verified in the field such as precise location and cover.

[4] If there are multiple critical facilities, only the facility with the highest points will be counted.

7.0 RISK MITIGATION

7.1 RISK REVIEW AND ESTABLISHMENT OF TARGET RISK THRESHOLDS

After calculating risk for all pipeline segments, a review of the risk profile is performed with a focus on high-risk pipeline facilities. A target risk threshold is established based on the risk profile and the comparative level of risk necessary to obtain confidence in the structural integrity of CGT's pipeline system. (Below is a risk profile for [illegible].)



Once the threshold is established, high-risk segments are reviewed for factors that are significant risk drivers. From these, pipelines are selected for investigation, and mitigation efforts are then proposed to address the significant risk drivers. Because any pipeline failure, regardless of the consequences, is highly undesirable, it may also be prudent to select a certain number of pipelines for investigation based on a high LOF. Consideration as to the number and selection of pipelines to investigate would include the relative LOF, threat type, past risk mitigation efforts, and confidence in LOF values.

Depending on the risk driver, mitigation efforts could include one or more of the following (Note that the risk mitigation efforts discussed in this section apply to pipeline segments not covered by RMP-06. Mitigation activities for covered pipeline segments shall be performed in accordance with RMP Procedure P-06):

- Inspections or tests to verify assumptions made in the risk calculation and integrity of the pipeline.
- Reduced operating pressure.
- Rerouting.
- Modification, alteration, or replacement of pipe or protective features.
- Additional Public Education as part of the PSIP Program discussed in Section 7.5 of this procedure or by additional line markers.
- Verification or modification of the consequences of a failure.

The following table provides an example of considerations that may enter into a decision process in developing a risk mitigation strategy:

[illegible]	[illegible]
In Line Inspection (ILI)	EC Threat, operating at or over 30% SMYS, installed prior to 1971 and can be piggable.
Corrosion Survey	Pipelines that have a high consequence, high or medium likelihood of LTP, LEC and are not economical to pig. Can also be used to determine if ILI is needed.
Leak Survey	Pipelines that are operating below 30% SMYS and are not high LEC or LTP
Pressure Test	Pipelines operating at or above 30% SMYS, with high likelihood of failure due to design/material issues, and have not been hydro tested.
Pipe Replacement	Pipelines with high likelihood of failure that were installed prior to 1930 and cannot be economically inspected using other methods.
Line Marking	High LTP, low/medium likelihood for other threats.
Landowner Notification	High LTP, low/medium likelihood for other threats

Risk values are reported out in a number of different venues. They are reported to the Manager of System Integrity in an annual report, they are provided in the budgeting process to evaluate the risk benefit of performing competing projects, and summary reports are provided to regulatory agencies for their review, and, for covered pipeline segments, risk and IMA Risk (discussed in section 8.0 of this procedure) are reported in the Integrity Management Plan for each pipeline segment.

7.2 INSPECTION/TESTING

An effective tool in risk management is inspections and testing. Due to the serious consequences of a pipeline failure, conservative assumptions are necessarily made as to the status of a pipeline when conditions are not known. It is very common to perform an inspection and test and verify that the condition of a pipeline is much better than assumed. The type of inspection or test specified is dependent on the threat and type of damage to be detected.

7.3 PROJECT PLANNING

RMP involvement in the Budget Planning Process also provides opportunities to reduce risk. Therefore, for each proposed project in the annual budget that is risk driven, a risk reduction calculation is performed so that an evaluation can be made as to the risk reduction benefits of the project. Often times, a project benefiting the operating capacity or operating efficiency will also reduce risk and based on a combined benefit will be the most cost effective project.

7.4 REHABILITATION

The RMP Project will propose such projects, as are necessary to establish and maintain an acceptable risk profile. In addition, the RMP will also support and propose other projects that will reduce risk where there are opportunities to justify projects based on reducing risk and reducing maintenance or operation costs. As projects are submitted for budgeting, they should be prioritized. Following is one prioritization strategy that could be used:

Priority	Attributes
1	High Consequence Area (HCA) Multiple Significant Risk Drivers High Total Risk (> [illegible]) >= 30% SMYS
2	Same as 1 except: % SMYS < 30% or Single Risk Driver > 30% SMYS in HCA
3	High Threat Risk or Total Risk (> [illegible]) Single Risk Driver > 30% SMYS or < 30% SMYS w/HCA
4	High Likelihood Threat or Total Risk Medium Consequence (Not HCA) < 30 % SMYS

Projects proposed to reduce risk shall be monitored to ensure that a reduction in risk has been obtained and that the results have been captured in the risk values.

7.5 PUBLIC SAFETY INFORMATION PROGRAM (PSIP)

The RMP will work in partnership with the Corporate PSIP Program to the extent necessary to ensure compliance with 49 CFR, 192.616 (Public Education) and 49CFR 192.615 (Emergency Plans).

49 CFR, 192.616 states "Each operator shall establish a continuing educational program to enable customers, the public, appropriate government organizations, and persons engaged in excavation related activities to recognize a gas pipeline emergency for the purpose of reporting it to the operator or the appropriate public officials."

49 CFR 192.615 requires establishing and maintaining adequate means of communication with appropriate fire, police, and other public officials and training of appropriate operating personnel to assure that they are knowledgeable of the emergency procedures and verify that the training is effective. Each operator shall establish and maintain liaison with appropriate fire, police, and other public officials to: (1) Learn the responsibility and resources of each government organization that may respond to a gas pipeline emergency; (2) Acquaint the officials with the operator's ability in responding to a gas pipeline emergency; (3) Identify the types of gas pipeline emergencies of which the operator notifies the officials; and (4) Plan how the operator and officials can engage in mutual assistance to minimize hazards to life or property."

8.0 RMP MAINTENANCE

8.1 FACILITY UPDATE

In general, the source of information used to calculate risk shall be obtained from PG&E's Geographical Information System (GIS). Exceptions are noted within the applicable procedures. There are also special cases where updated information is made available from other sources (such as from pipeline engineers, In-Line Inspection (ILI) reports, or Corrosion Engineers).

Changes in facility properties shall be incorporated into the Risk Calculations at least annually. Examples of facility properties include location, material properties, coating, operating status, cover, pipe specification, and structures near the facility.

8.2 HAZARD UPDATE

RMP will monitor industry experience, as well as PG&E experience to identify trends in threat prediction, mitigation effectiveness, and advances in inspection and risk management technology and adapt the program to new information as necessary to keep the program current and robust.

Data bases necessary for making accurate risk evaluations will be maintained and updated as necessary to ensure hazard information is current. Information necessary to accurately determine and track risk will also be updated as follows:

[redacted]

Threat	Update Interval
Third Party Dig-ins	As Submitted, Annually - Into Risk Calculations
Leak Reports (SS, CW)	As Submitted, Annually - Into Risk Calculations
Seismic (Fault Crossings)	5 years (as Provided by [illegible])
Seismic (Vertical or Horizontal Ground Acceleration)	5 years (as Provided by [illegible])
Slope Stability	5 years (as Provided by [illegible])
Liquefaction	5 years (as Provided by [illegible])
Water Crossing	10 years

8.3 CONSEQUENCE UPDATE

RMP will monitor industry experience, as well as PG&E experience to identify trends in consequence prediction and mitigation effectiveness and adapt the program to new information to keep the program current and robust.

Data bases necessary for making accurate risk evaluations and support Integrity Management activities as required by RMP-06 will be maintained and updated as necessary to ensure consequence information is current. The following Geographic information will also be updated as follows:

Consequence	Update Interval
Electric Transmission	10 years
Highways	5 Years
Other (Foreign) Pipelines	5 Years
Airports	10 Years
Water Crossing (Navigable Waterways)	10 Years
Land Base*	5 years
Pipeline Aerial Patrol	Annual
Identified Sites (as defined by RMP-06)	Annual
Parcel Data (as required by RMP-06)	Annual
Identified Sites provided by Public Safety Officials (as required by RMP-06)	Bi-Annual

* Land Base information includes Roads, Highways, Railroads, Water Crossings (Other than Navigable Waterways), parks, etc.

8.4 ALGORITHM REVIEW

At least once each calendar year, the Integrity Management Group will review the threat and consequence algorithms with the appropriate steering committees and make changes as necessary to reflect regulatory requirements and best industry practices.

[redacted]

8.5 REVISION TO RISK CALCULATIONS

Risk calculations shall be reviewed annually and recalculated as necessary to reflect changes in facility, threat, or consequence data, and/or changes to the threat or consequence algorithms.

9.0 RISK FOR INTEGRITY MANAGEMENT

This procedure applies to both covered and non-covered pipe segments as defined in RMP-06. In addition to the requirements specified in this procedure, RMP activities associated with covered pipeline segments must also comply with the requirements of RMP-06.

In addition to the risk values calculated per the preceding sections of this procedure, HCA risk, as defined below, will also be calculated for all covered pipeline segments.

HCA RISK = LOF*(1+(PIR/1800)) Equation 4

Where, LOF = Likelihood of Failure based on Equation 2 of this procedure.

PIR = Potential Impact Radius as defined by RMP-06

Relative Risk Ranking is required by RMP-06 for all covered pipeline segments for the purpose of prioritizing assessments. Because the primary focus of RMP-06 and the Integrity Management Rule (covered in 49 CFR Part 192 Subpart O) is to provide personnel protection, it is necessary to remove Impacts On Reliability (IOR) and Impacts on Environment (IOE) used to calculation the Consequence of Failure given in Equation 3 of this procedure. Also, because all covered pipelines are, by definition, in High Consequence Areas, it is not necessary to consider anything more than the relative size of a failure. Therefore factoring in the size of the potential impact radius is sufficient to rank the relative Consequence of Failure for covered pipeline segments.

IMA COF = 1+(PIR/1800) Equation 5 5

PG&E's HCA risk calculation does not address two of the threats existing in a few of its covered pipelines: Internal Corrosion (IC) and Stress Corrosion Cracking (SCC). The likelihoods of failure for these threats were not included because they are currently relevant in less than 2% of the HCA pipelines. Instead pipelines with these threats were categorized as "high risk" and scheduled for assessment prior to 12/17/2007. The only exceptions are:

- 25.6 miles of Stanpac 3 with IC threat that will be ILI inspected in 2007 and
- 8432' in two CFMs that were installed between 1965 and 1984. One of the CFMs is operating under 20% SMYS and will be DA'd in 2009. The second, operating at 41% SMYS, will be smart-pigged in 2012.

Future assessments and incidents shall be reviewed to provide the input necessary to determine if these threats are more systemic and should be included in the system-wide risk calculation. The following assessments shall be performed on an on-going basis to validate the current threat assumptions: 5

For SCC:

- All direct examinations performed as part of the integrity management program shall determine, using an appropriate inspection tool, if SCC damage is present, whether the pipe segment was identified as possessing the threat or not.

For IC:

- All ILI assessments identify that identify wall loss due to IC shall determine, using appropriate inspection tool, if IC damage is actually present.
- All direct examinations performed as part of the integrity management program shall determine, using appropriate inspection tool, if IC damage is present.

If future pipeline assessments or incidents show these threats to be relevant, a separate likelihood factor shall be developed to prioritize the pipeline segments and ensure the highest risk segments are addressed first.