Integrated San Bruno Response Plan

Interim Safety Measures

PG&E has undertaken a series of immediate short-term operational measures to mitigate potential threats to the gas transmission pipeline network. These actions will provide an additional foundation of public safety while PG&E implements a number of long-term changes to its gas operations.

Some of these actions include implementing more conservative "mark and locate" and "call before you dig" procedures and requirements. PG&E has also substantially improved its procedures for providing advance information about the location of pipelines to customers, municipalities and emergency response providers.

The company is committed to continuing to be transparent to the public and the CPUC on all activities involving its natural gas distribution and transmission systems.

Pipeline Integrity Verification: Following are a number of activities taken to enhance the integrity of the pipeline system, including validating maximum allowable operating pressure (MAOP) based on compilation of existing records.

Completed:

- Retrieved and scanned more than 1.7 million paper documents going back more than 50 years to validate MAOP of all pipelines in High Consequence Areas (HCAs)
    - PG&E has verified pressure test documentation for approximately 1,155 miles of HCA pipeline
    - PG&E has validated the MAOP for approximately 450 miles of high priority pipelines in HCAs without prior strength tests
- Completed a comprehensive and accelerated leak survey of PG&E's entire transmission pipeline system
- Completed an accelerated direct assessment instrument survey of PG&E's gas transmission lines in San Bruno and its distribution system in and around the impacted neighborhood
- Identified approximately 35 miles of pre-1962 30" DSAW pipe for video inspection
    - PG&E has video inspected approximately 6 miles of pipe in various locations throughout the transmission system
    - Where possible, PG&E will conduct additional video inspection in conjunction with its planned 2011 hydrostatic testing

In Process

- Collecting and verifying pipeline strength tests, as built construction drawings and relevant documents to validate the MAOP of pipelines and respective components
    - The company estimates that the MAOP validation project will be completed for all PG&E transmission pipelines by 2013 (~5,800 miles)
- Continuing to excavate and inspect pipe segments within the transmission system to verify pipe specifications and confirm pipeline integrity

Increased Leak Surveys & Patrols: PG&E is more regularly monitoring its gas transmission system until pipeline segments without documented strength tests can be tested or replaced.

In Process

- PG&E is conducting "reliability" aerial patrols on a monthly basis to enhance the integrity of the system that brings gas supplies from the Oregon and Arizona borders
    - The remainder of the system is patrolled on a quarterly basis
- PG&E is conducting weekly ground patrols on the local transmission system on the San Francisco Peninsula

Planned

- For pipes that have planned strength tests and inspections, PG&E is increasing annual and bi-annual leak surveys to bi-monthly leak surveys

Pressure Reductions: PG&E is reducing pressure in some pipelines to increase the margin of safety until the MAOP can be validated through actions such as records validation, pressure tests, or pipe replacement. Any interim pressure reduction will also consider the potential safety impacts of uncontrolled customer outages along with pipeline integrity safety margins.

Completed:

- There are 29 primary pipeline pressure reductions at this time resulting in 1,606 miles of transmission pipe operating under a reduced pressure condition
    - Approximately 25% of all transmission mileage, and as a subset 50% of all backbone/bay area loop mileage, is under a restriction

In Process:

- Future interim pressure reductions can be called for in two ways:
    - The MAOP validation process identifies a segment where the calculated MAOP is lower than current operating pressure and pressure should be reduced to the calculated MAOP
    - The decision tree analysis PG&E is proposing in the Pipeline Safety Enhancement Plan, which will be filed with the CPUC later this month, identifies an interim pressure reduction on specific pipe segments as a recommended mitigation measure

Conclusion: The immediate safety measures will provide added public safety during this period of change. Portions of the initiatives involved in the interim measures will also help meet the company's overall goals for future system modifications, such as the development of electronic records and data systems.

Gas Operations and Control

The San Bruno accident underscored the need for a comprehensive review of the Gas Operations and Gas Control business areas. PG&E has launched a number of initiatives designed to improve the operations of its gas pipeline network by focusing on infrastructure, operations, and processes. The objective is to bring best practices of the industry to PG&E's Gas Operations and Control.

Station Updates: PG&E is enhancing its infrastructure and operations to mitigate risk and allow for the rapid response to threats or problems.

In Process

- Conducting condition assessments on 24 gas transmission stations this year
    - Identifying capital and expense improvements within each station in order to bring each stations up to a new level of instrumentation, automation, and control
    - Engineering in progress for major improvements to at least four stations
- Implementing physical safety improvements and cyber security efforts throughout the system

Policies & Procedures: PG&E is updating gas operations policies and procedures to emphasize actions that improve public safety. PG&E is creating consistent, specific and standardized procedures, particularly in emergencies, for its facilities.

Completed

- Updated documentation for station operating procedures which included industry benchmarking analysis
- Implemented Control Room Management (CRM) requirements of 49 CFR Part 192
    - New 911 notification process improvements for Gas Control provides guidance to Gas Control and requires that the responsible 911 Emergency Response Center(s) be notified during any emergency incident that may affect the safety of the public, property or the environment.

In Process

- Establishing detailed procedures for system-wide operations
    - Station procedures will guide station start-up, operational protocols, facility maintenance, clearance protocols and records keeping
    - Implemented processes to ensure Gas Control immediately calls the appropriate local emergency agency (e.g., 911) when the operator determines there is probable cause to believe a pipeline rupture has occurred
    - Retained outside consultants and experts in operational assessment, human factor analysis, alarm management, and operator training to

make recommendations for SCADA and control room procedure improvements

- Conducted alarm management workshop with employees to incorporate recommendations
- Developing and implementing gas control operator practices and updated clearances processes and training
- Continuous review and improvement of gas control procedures and updating gas control policies through the CRM change management process

Planned (Implementation Has Not Begun)

- Update SCADA procedures to ensure that manually-input information is accurate and that clear instructions on pipeline segment shutdowns are available during emergencies
- Conduct training for alarm management, emergency response and SCADA change management
- Upgrade alarm management software systems

Conclusion: PG&E is incorporating lessons learned from the San Bruno accident and recommendations from outside experts to update infrastructure, technology, and gas operating policies and procedures. Updated control rooms and stations will promote public safety and enable timely responses to accidents while updated tools and resources for personnel will allow them to more effectively respond in the event of an emergency.

Risk Management

PG&E is improving its risk management infrastructure to better identify potential risks and implement mitigation strategies in a timely manner. PG&E is filing a Pipeline Safety Enhancement Plan later this month with the CPUC that details new pipeline safety initiatives. These initiatives will include targeted pipeline replacement, pressure testing, and pipeline retrofits to accommodate in-line inspection tools (smart pigs).

Enterprise Risk Management: PG&E is enhancing its enterprise risk management processes.

Completed

- Completed a benchmarking study that identified best risk management practices in the utility, finance, and energy industries

In Process

- Combine the benchmarking results with the findings of the Independent Review Panel report to develop a strategy to improve risk management within the company

Under Consideration

- Enhance risk management governance:
    - Establish line of business risk committees
    - Establish operations risk committee chaired by the CEO
    - Establish a risk committee of the Board of Directors to oversee enterprise risks
- Invest in people:
    - Identify and develop line of business risk managers to ensure rigorous, thoughtful analysis of risks
    - Expand enterprise risk management staff to enable direct involvement in, and oversight of, risk management activities at the line of business level
    - Develop risk management as a core competency among employees.
- Improve processes:
    - Develop a standard and consistent approach to evaluating all risks
    - Employ a database to track and manage mitigation activities

Investment: PG&E is mitigating potential threats through multiple investment activities including pressure testing and pipeline replacements. PG&E plans to conduct these activities and other key infrastructure upgrades in two Phases, addressing the highest priority projects in Phase 1, which runs from 2011 through 2014.

Completed

- Conducted a system-wide review to verify class location designations and immediately took action to reduce pressure on pipelines determined to be operating out of class
    - Projects underway to replace or test pipe to allow for pressure restoration
- Installed and retrofitted several mainline valves and cross-ties for remote control operation on L-132, L-132A, L-101 and L-109 within the San Francisco Peninsula
    - Automated valves provide for the quick shutoff of gas to pipeline segments in the event of a pipeline rupture

In Process

- PG&E expects to strength test approximately 165 miles in 2011
- PG&E proposes to strength test about 780 miles of pipe during Phase 1 of the Pipeline Safety Enhancement Plan (2011-2014)
- PG&E has retrofitted 988 miles of pipe to accommodate ILI tools through 2011
- By the end of 2014, PG&E expects to have a total of 1,480 miles (24%) of the gas transmission pipe retrofitted to accommodate ILI tools
- The Valve Automation Program will expand PG&E's use of automated gas transmission pipeline system isolation valves ("automated valves")
    - Plan to install additional automated valves in heavily populated areas and where active earthquake faults pose a threat to the pipeline
        - In 2011, the company expects to complete installation of 29 automated valves on the San Francisco Peninsula
        - By the end of 2014, PG&E has proposed to automate 228 valves throughout the system

Planned (Implementation Has Not Begun)

- Update SCADA system to provide operators in the Gas Control Center with the tools and training to identify and improve our response time in the event of a pipeline rupture
    - Install additional SCADA monitoring points for pressures and flows to enhance understanding of pipeline dynamics
    - Deploy detailed SCADA viewing tools to provide comprehensive understanding of pipeline conditions in real-time
    - Deploy situational SCADA awareness tools to enhance how operators are alarmed of potential problems
    - Provide new shut-down protocols
    - Develop and deploy interactive GIS/SCADA query tools so that operators can quickly access physical pipeline information and geography

Outreach & Communication: PG&E is investing in communications that raise public awareness of gas system safety issues and upcoming capital investment projects.

Completed

- Conducted exercise with public officials and first responders to simulate gas curtailment scenarios and build broader understanding of how to prepare for potential events
- Held over 100 meetings with cities, counties and other community groups responding to questions and concerns

In Process

- Conducting extensive customer and community outreach to notify and educate affected customers of any field activities that may impact them and address any concerns they may have
    - Informing public and local government officials of schedule and progress for field work
    - Methods of outreach include canvassing, door hangers, open houses, interactive voice responses, letters, media press releases, web site, social media, 24 hour 1-800 phone lines, and Public Service Announcements

Quality Assurance: PG&E is making changes to the way it does business so that all field work conducted for both the electric and gas operations is consistent with PG&E standards and meets or exceeds regulatory requirements. The company will also ensure that appropriate corrective action mechanisms are in place and that there is transparency for all findings.

In Process

- Gas Quality Assurance team is establishing clear audit and review procedures to identify areas for process improvement and to ensure work is done according to established standards, guidelines and procedures and that actions identified through audits are effectively tracked and implemented

Conclusion: PG&E is working to restore public trust in its gas system by creating new standards and guidelines for assessing potential risks, and mitigating them through corrective action. To that end, PG&E has detailed an extensive capital investment program designed to improve the safety of the company's pipeline system by focusing first on infrastructure projects that are of highest priority based on the potential risk.

Integrity Management

The Independent Review Panel report found that though PG&E was once an industry leader in pipeline integrity management, more recently the company has lacked leadership in this area, has failed to make integrity management a core value across all operations and is not providing sufficient resources to achieve its goals.

Integrity management is a critical part of a public utility's responsibility, and PG&E is committed to a complete review and upgrade of the program to ensure the integrity of its gas pipeline network.

To that end, the company is undertaking a number of initiatives to improve its integrity management program and supporting systems. Much of this effort focuses on records and data coordination, which are key to facilitating comprehensive, rapid, and accurate decision-making. Below are details of the initiatives to improve integrity management, and an accounting of the progress so far as well as what still needs to be done.

Program Modification: PG&E is updating its policies and procedures to emphasize safety, reliability and performance over prescriptive actions.

Completed:

- Implemented Distribution Integrity Management Program

In Process

- Conducting a complete review of entire Gas Transmission Integrity Management Program and procedures
- Benchmarking current Integrity Management Program against industry leaders
    - Once the benchmarking is complete, PG&E will work to bring current program to best-in-class
- Updating project prioritization methods
    - New system will be more consistent and rigorous, will more directly and uniformly incorporate structured risk assessment across facilities and functions, and will allow for project priorities to be monitored over time

Records Keeping and Data Communication & Coordination: PG&E is modernizing its data management systems and procedures to ensure data is comprehensive, accessible and traceable. The company's improved systems will include data about assets, tools and materials, and information such as test records, replacement logs, maintenance logs and job histories. The information will be organized and integrated to allow for cross-organization access and visibility, and will contain all pipeline strength tests and pipeline features data necessary to calculate MAOP of pipelines and all associated components.

Completed:

- Retrieved and scanned more than 1.7 million paper documents going back more than 50 years
    - Scanned records will be used to validate MAOP of all pipelines in HCAs (~1,800 miles)

In Process

- Conducting training for record keeping, including Strength Test Pressure Record training, A-Form training, and as-built training
- Developing and implementing technology infrastructure to ensure data reliability is maintained
- Building material traceability for gas transmission pipeline components – from receipt through installation to retirement from service

Planned (Implementation Has Not Begun)

- Conduct comprehensive review of data and information management systems to validate the completeness, accuracy, availability and accessibility to data and information
- Create a technology infrastructure that will improve data reliability and enable improved decision-making capabilities related to risk and integrity of gas transmission system (Gas Transmission Assets Management effort)
    - Consolidate important pipeline records into two core electronic systems: SAP and GIS systems will enable PG&E to more efficiently integrate pipeline records
    - Program goal for infrastructure is to permit tracking and integrating repair history, technical specs and inspection results enabling risk-based pipeline integrity and maintenance decisions
- Develop multi-year plan for data management system to collect, correct, digitize and effectively manage all relevant design, construction and operating data for the gas transmission system.
- Develop new processes using mobile tools to increase use of electronic data in evaluating risk and making future operating and maintenance decisions.

Conclusion: PG&E is benchmarking its Integrity Management Program against industry leaders. The improvements that PG&E is making to its integrity management processes and infrastructure will allow the company to make more informed decisions relating to operations, maintenance and capital investment. Central to this goal are complete, transparent, traceable and readily accessible data and records pertaining to pipeline safety.

Safety Culture

The San Bruno accident and its aftermath have made it clear that PG&E's most critical priority is to create a culture of safety – one in which employees feel empowered to report and act on safety concerns.

To achieve this objective, management is focused on creating an environment where significant and essential behavioral changes at all levels can occur. These efforts include articulating and reinforcing clear goals and expectations, structuring incentives that align with those goals, measuring progress using established metrics, and effectively communicating the company's goals and the steps to achieving them with customers, regulators and the community.

Management Focus: PG&E is working to expand and enhance management's focus to recognize that public safety – not just employee safety – is the primary goal. By incorporating safety into all aspects of the company's activity, including compensation metrics, PG&E management will be demonstrably focused on public safety in addition to the business needs and financial returns. Management is:

- Establishing clear procedures and guidelines to ensure work is conducted in a manner that provides for the safety of the public and employees
- Ensuring employees understand and are implementing procedures and guidelines appropriately
- Educating the public and emergency responders about our gas system, what to do in case of emergency and how they can help keep it safe
- Benchmarking activities and seeking guidance from, and validate efforts through, respected third parties

In Process

- Reviewing and synthesizing various recommendations relating to culture so that ideas can be incorporated in operating plans for implementation and execution
- Strengthening alignment of compensation with employee and public safety in 2012 Short-Term Incentive Plan (STIP), pending Board approval

Outreach & Communication: PG&E's communications, internally and externally, will demonstrate the commitment of management to public safety. To that end, the company is refocusing its goals and communications on public safety.

Completed:

- Established public web pages with detailed gas system and safety information
    - Includes the location of gas transmission lines
- Mailed more than 2 million letters to homes and businesses located within ~2,000 feet of PG&E gas transmission pipelines
    - Provided information and additional resources (e.g., Safety Pamphlet)
- Established a first responder pilot program with the City of San Francisco and City of Fremont to facilitate the sharing of critical information with first responders

In Process

- Updating company goals to explicitly include public safety
- Reviewing and updating field procedures to ensure that public safety is clearly noted and prioritized
- Enhancing outreach to first responders
    - Providing pipeline maps, hosting training sessions, developing improved processes, and expanding pilot program noted above
- Ensuring that customer concerns regarding gas are quickly and effectively escalated
- Participating, through AGA, in a Pipeline System Safety Initiative, which is a pipeline industry-wide initiative to develop information sharing and best practice programs and protocols

Conclusion: PG&E is undertaking a cultural transformation that will embed public safety as the core value of the company.

Organization

PG&E is addressing organizational shortfalls that have become apparent since the San Bruno accident. As the Independent Review Panel wrote, "PG&E has been in a state of perpetual organizational instability for more than a decade." The company's objectives are organizational clarity with clearly-defined roles throughout the company, populating positions with professionals who have the right skill set for the job, and establishing metrics against which job performance will be measured. Recently, PG&E hired a new Chairman and CEO with extensive engineering experience and with significant accomplishments in achieving excellence in utility operations and safety.

Organization Structure & Expertise: PG&E is changing its organizational structure to improve operations and bolster the company's overall public safety efforts. The company is also reviewing the organization to ensure that staffing levels – and staff experience and expertise – is aligned with operational demands. Upon completion of the initiatives described below, there will be clear roles and responsibilities for electric and gas, and for gas transmission and distribution.

Completed:

- Separated gas and electric organizations
    - Each business is now led by an experienced Executive VP with significant subject matter expertise
- Created a new gas operations organization with the authority, resources and mandate to reform all gas operations
- Senior leaders of the new organization report directly to the new Gas Operations EVP, a veteran gas turnaround specialist, and are accountable for the following areas:
    - Public Safety & Integrity Management
    - Asset Knowledge Management
    - Standards and Policy
    - Project Engineering & Design
    - Investment Planning
    - Transmission Maintenance & Construction
    - Distribution Maintenance & Construction
    - Gas System Operations
- Created new senior leadership positions
    - VP of Safety
    - VP of Pipelines (to lead all infrastructure upgrade efforts)
    - VP of Integrity Management
- Hired senior director of Data Integrity to improve records system completeness and accuracy

- Replaced three of the five most senior managers in the gas organization with highly rated internal candidates and hired three experienced senior level gas engineers for key director-level assignments
- As of early August, PG&E has hired many new employees into the Gas Operations organization
    - ~25 Managers
    - ~90 Engineers and Senior Engineers
    - ~30 Mapping and Estimator Employees
    - ~5 Project Managers
    - ~10 Maintenance and Construction Employees
- PG&E has also contracted with dozens of expert gas operations consulting firms to support San Bruno response activities
- PG&E will continue to evaluate the need for additional staff and hire accordingly

In Process

- Interviews for new VP of Safety and other key positions within the new gas operations organization structure are in progress
- Reviewing staffing and qualifications across the organization to ensure that functions are staffed with qualified employees with the appropriate skills
- Developing the risk management team with the skills necessary to conduct state-of-the-art practical risks management analysis
- Upgrading apprentice and journeyman training programs to best practice status
- Strengthening supervisor training to improve motivating and coaching for safety

Conclusion: PG&E's future organization structure will have clear roles and lines of responsibility. The company will be led by individuals with operational experience and strong technical qualifications. Management performance will be measured against benchmarks from industry leaders and will be expected to create a culture of accountability. Additionally, support staff across the organization will have the appropriate skills and training to ensure the company provides safe, reliable and affordable energy to its customers.

Emergency Planning & Response

Though the Independent Review Panel report found PG&E's Emergency Plan "complete, thorough and [containing] many best practices," it called for improvements at the regional and divisional levels. Specifically, the Independent Review Panel called for a review and restructuring of emergency plans with a focus on consistency. In addition, they recommend a SCADA study and a multi-year program to implement the results of the study.

Planning & Response: PG&E is updating emergency response plans to reflect recommendations and current best practices. Upon completion of the initiatives described below, the company will have a comprehensive and up-to-date emergency response plan that will integrate and standardize emergency response across the company.

Completed:

- Benchmarking – PG&E contacted ~25 other utilities and first responders to identify best practices and industry standards
- Incorporated results into gas emergency response plan updates and improvements
    - Organized into three areas: (1) Prevention (2) Preparedness (3) Recovery
    - Clearly defined roles and responsibilities
    - Defined emergency scenarios with three incident severity levels and developed appropriate response plans
    - Integration with integrity management and metrics to spot issues early

In Process

- Benchmarking – international search for best practices (Q3 2011)
- Incorporating benchmarking results into plan for electric emergency planning (Q3 2011)
- Organizational changes to support enhanced emergency planning and response (Q3 2011); exploring two options:
    - Combined Gas and Electric Emergency Preparedness Prevention & Response organization reporting directly to Corporate Services
    - Separate gas and electric EPP&R organizations, reporting respectively to the executive VPs of gas and electric operations
- Implementing new, fully functioning mobile command centers to be used in emergencies
    - One of six centers have been completed; additional five will be completed by 2012

Planned (Implementation Has Not Begun)

- Execute the restructuring of all division, regional and company emergency plans to incorporate industry best practices

- Conduct a study of SCADA requirements to improve shutdown capabilities in the event of a future pipeline rupture

Training and Outreach: PG&E is revamping its training materials and, upon completion of current and planned initiatives, staff and other parties will be well trained in emergency response. PG&E is not only embracing training and exercising as part of its core competencies, but also working with external partners such as first responders and public safety officials to enhance training for emergency preparedness and response. Enhanced emergency prevention, preparedness and response programs consist of education programs for first responders, contractors, infrastructure departments, community members, school children, and other stakeholders.

Completed:

- Increased educational and interactive session – including practice drills – with first responders to meet demand
- Developed contact list for all local first responders (~1800) to facilitate future communication and notifications; will have the ability to track usage more accurately than with mailing to improve outreach over time
- Launched PG&E first responder website portal
- CAISO Gas Curtailment Exercise on 8/12
- Provided maps, GIS data, and other information to first responders

In Process

- Incident Command System training (September)
- First responder workshops (Q4 2011)
- First responder online portal for training material downloads and for scheduling a PG&E representative to come to site and deliver training (Q1 2012)

Planned (Implementation Has Not Begun)

- Meet with local governments and agencies to discuss gas pipeline maps and will provide future trainings on responding to a natural gas leak or fire
- Provide free, regionally-based training to fire departments and agencies located within PG&E's service territory
- Develop and deploy Gas Controller training and job aids so that personnel are well versed in using automated isolation valves in emergency response
- Develop and deploy training simulation tools to prepare Gas Operators for potential line rupture scenarios
- PG&E will develop an improved process for incoming emergency calls, to efficiently dispatch Gas Maintenance and Construction personnel, Gas Service Representatives and other first responders to the scene of a natural gas emergency

Conclusion: In enhancing the prevention, preparedness and response program, PG&E will create a consistent, coordinated emergency response plan that

incorporates learnings from prior experience and industry benchmarks. Additionally, a more coordinated plan will ensure that emergency response preparedness is embedded in PG&E's operations.

And, with the implementation of public safety education programs and enhanced outreach, PG&E expects to see fewer preventable incidents (such as dig-ins to gas and electric assets), a more informed and safer citizenry, improved coordination during emergencies, faster restoration times following an incident, and line-of-sight accountability for prevention, preparedness and response performance.