Testimony of Nick Stavropoulos
Executive Vice President, Gas Operations
Pacific Gas and Electric Company

Before the Committee on Commerce, Science and Transportation
Subcommittee on Surface Transportation and Merchant Marine Infrastructure, Safety, and Security
United States Senate

Legislative Hearing on:
PIPELINE SAFETY SINCE SAN BRUNO AND OTHER RECENT INCIDENTS

October 18, 2011

Good afternoon Chairman Lautenberg, Ranking Member Wicker, Senator Boxer and other members of the Subcommittee. My name is Nick Stavropoulos and I am executive vice president of Gas Operations for Pacific Gas and Electric Company or PG&E. PG&E is one of the largest combined natural gas and electric utilities in the United States. Headquartered in San Francisco with nearly 20,000 employees, the company delivers electricity and natural gas to approximately 15 million people in Northern and Central California. PG&E's extensive natural gas system integrates more than 42,000 miles of natural gas distribution lines and more than 5,700 miles of natural gas transportation (or transmission) pipelines.

I want to thank you for providing me with the opportunity to be here today to participate in this hearing on the current state of pipeline safety following the San Bruno accident and other recent pipeline incidents in other parts of the country.

The Committee's focus on this issue is critically important; the events of the evening of September 9, 2010 are a stark reminder of that. On that evening, PG&E's natural gas transmission line running through the Crestmoor neighborhood of San Bruno, California ruptured and the results were devastating. As has been widely reported, eight people lost their lives and dozens of people were taken to local hospitals and treated for serious

burns and injuries. Thirty-eight homes were destroyed and many more were damaged. In total, more than 375 households were forced to evacuate.

The 13 months since that accident have been an ordeal for the Crestmoor community; most of us cannot truly comprehend what they experienced that night and continue to go through today.

My heart goes out to all the families and people affected by this tragedy. We know that it has been a long road to recovery and that it is not over. We want to reiterate PG&E's commitment to stand by the people and community of San Bruno. We have tried to do what's right to help rebuild the community – and to help people rebuild their lives – and we will continue to do so. We are also moving forward aggressively to make the necessary changes and upgrades in our natural gas system to make sure this does not happen again.

For these reasons, I want to thank this Committee's leadership on the issue of pipeline safety. PG&E strongly supports the Pipeline Transportation Safety Improvement Act of 2011, which was approved unanimously by the Committee, and now awaits action by the full Senate. It includes provisions that are critically important to enhancing the safety of the nation's pipeline system, including those related to the validation of the maximum allowable operating pressure (MAOP) for pre-1970 pipelines, the installation of remote control or automated valves, and excess flow valves. These are important policies that will help enhance the safety of anyone who lives or works around natural gas pipelines and facilities. We hope this legislation can soon be passed by Congress and signed into law.

NTSB Recommendations and PG&E Actions

The National Transportation Safety Board (NTSB) recently completed a meticulous review of the San Bruno accident. I want to thank the NTSB for providing PG&E with a thorough set of recommendations and findings. We fully share the NTSB's commitment to ensuring that such a horrific accident never happens again.

Toward that end, PG&E' embraces *all* of the NTSB recommendations and those of other major investigations of this accident, such as the Report of the Independent Review Panel, which was ordered by the California Public Utilities Commission (CPUC). In the year since the tragedy, we have taken numerous actions including many recommended by the NTSB and others.

The balance of my testimony will be devoted to reviewing the steps we have taken to build a safer and more reliable natural gas system. Attached to my testimony is a document (Attachment A) that summarizes actions taken in direct response to the NTSB recommendations.

In order to successfully implement the NTSB's recommendations, our number one priority and overarching focus is building a "safety first" culture at PG&E – both public and employee safety. Public and employee safety must describe not only what we *say* we believe in, it must be reflected in our *actions*, values and priorities. Every employee must understand how their actions contribute to the safe operations of our system, and they must never doubt the imperative need to report and act upon any concerns they may have.

A first step we took to build a "safety first" culture at PG&E was to benchmark against industry leaders to see how we compare and determine what we need to do to become a leading utility. We also separated PG&E's gas and electric operations and associated functions to ensure clear roles and responsibilities. Now the organizational structure within PG&E's gas function mirrors the work and precisely defines roles and accountabilities. We are in the process of putting new standards and practices in place that support employee and public safety.

In addition to making organizational and structural changes, we have taken numerous other actions, several of which were recommended by the NTSB, including the following:

- **Validating and Modernizing Our Records.** PG&E must understand its assets inside and out. Having accurate asset knowledge and a robust integrity management process are fundamental to operating a safe and reliable natural gas transmission and distribution system. Specifically, we have:

- Retrieved and scanned more than 2.1 million paper documents dating back to the 1920s to validate the maximum allowable operating pressure (MAOP) of all pipelines in Class 3 and Class 4 locations, and Class 1 and Class 2 high consequence areas (HCAs);
- Verified strength test documentation for more than 1,150 miles of HCA pipeline;
- Validated the MAOP for more than 750 miles of high priority pipelines in HCAs without prior strength tests; and
- Video inspected pipe in various locations throughout the transmission system.

- **Strength Testing Our Pipes**. PG&E has embraced the idea of eliminating the "grandfathering" of older pipelines and is in the process of an extensive strength testing and reviewing of our pipeline system. Starting with pipes that have similar qualities to the pipe that ruptured in San Bruno, we have successfully completed pressure tests or identified strength test records for approximately 97 miles of pipeline and are on track to complete testing between 144 and 160 miles this year. As of September 30, more than 85 transmission pipeline miles have been hydrostatically tested or replaced. As part of our Pipeline Safety Enhancement Plan (PSEP) that we filed with the CPUC, we propose pressure testing approximately 783 miles of pipe over the next five years.

- **Automating Our System**. PG&E recognizes the importance of modernizing our system and using technology to help us identify potential issues and address them quickly. As part of our efforts, we are installing automated shut-off valves (ASVs). We are on track to install 29 automated valves in 2011, targeting areas of high seismicity on the Peninsula, and have proposed to install a total of 228 ASVs as part of our PSEP.

  PG&E applauds Senator Boxer, Senator Feinstein and Representative Speier for calling attention to the important role that ASVs can play in promoting pipeline safety, and for making provisions related to ASVs a legislative priority.

We are also enhancing our Supervisory Control and Data Acquisition (SCADA) information system by including information related to pipeline pressures, valve position and gas flow.

- **In-Line (ILI) Inspection**. Through 2011, PG&E will have retrofit close to 1,000 miles of pipe to accommodate ILI tools. By the end of 2014, PG&E expects to have a total of approximately 1,480 miles (24 percent) of the gas transmission pipe retrofitted to accommodate ILI tools.

- **Sharing Information and Improving Our Emergency Response Procedures.** PG&E recognizes that it is our responsibility to ensure that first responders have the information they need to do their jobs and that, as a company, we have clearly established processes and procedures for first responder engagement. Since September 2010, PG&E has:

    - Required gas control room operators to notify 911 emergency call centers of affected communities immediately and directly when a possible rupture of any pipeline is indicated;
    - Updated emergency response plans to reflect current best practices and is training employees on the plan;
    - Conducted emergency planning exercises with public officials and first responders to simulate gas curtailment scenarios and prepare for potential events;
    - Launched a secure website for first responders detailing the location of PG&E's gas transmission pipelines and mainline valves;
    - Mailed more than two million letters to individuals who live within 2,000 feet of a natural gas transmission line and providing them with information regarding natural gas safety.

PG&E is in the process of updating the SCADA system to provide operators in PG&E's Gas Control Center with the tools and training to identify and improve response time in the event of a pipeline rupture.

- **Improving Work Clearance Procedures**. The investigation of the events leading up to the San Bruno accident revealed that changes need to be made to PG&E's work clearance procedures. PG&E has taken steps to:

    - Develop and implement a comprehensive controls framework based on industry best practices. This framework will focus on proactive practices to assess, prevent, detect and respond to potential threats (e.g., physical, logical and personnel) to PG&E's system. We have sought subject matter experts to advise us on these issues and have incorporated their expertise;
    - Establish standardized procedures to effectively deal with abnormal and emergency operating situations;
    - Improve the quality of information available to operators by providing increased pipeline pressure and flow information; and
    - Upgrade alarm management software systems.

The initiatives outlined above are in addition to steps we took immediately following the accident, which included reducing the operating pressure on a significant number of our gas transmission lines, increasing leak surveys and patrols for segments of transmission pipeline, and conducting weekly ground patrols on the local San Francisco Peninsula transmission system.

PG&E's Pipeline Safety Enhancement Plan

While we have taken many actions to date to improve the overall safety of our system, we know that there is much more to do. The state of California is working toward codifying the most aggressive pipeline safety standards of any state, and we are wholly supportive of those efforts. As part of its pipeline safety efforts, the CPUC directed the state's investor-owned utilities to submit plans to enhance and improve the safety and operations of their natural gas systems. On August 26, 2011, PG&E submitted the Pipeline Safety Enhancement Plan, which represents a clear break from the way California and its utilities approached pipeline safety in the past, and the way it will be approached in the future. The result of this effort will be tougher standards for pipeline safety that will better serve the public and PG&E customers.

The gas pipeline infrastructure in California and across the United States contains a wide range of pipeline types and vintages. Like other parts of our country's infrastructure, natural gas transmission pipelines were generally built with the best design tools, technology, materials and techniques available at the time they were constructed and installed. Over time, as those methods and materials improved, the regulations and codes governing the construction of the pipelines have also evolved to require more effective inspection control techniques, resulting in better quality and confidence in pipeline integrity. One of those changes, adopted by federal regulators in 1970, required all new gas transmission lines to have their MAOP established through pressure testing and records validation.

Following the San Bruno accident, the CPUC has rightly insisted on a more rigorous standard for older pipelines, consistent with the NTSB recommendations. PG&E fully supports this new policy direction. As previously indicated, we have undertaken a massive and unprecedented program to pressure test or replace every pipeline that does not have complete pressure test records, and validate the MAOP of older pipelines through a rigorous, records-based analysis.

The actions and investments outlined in the PSEP are the roadmap for taking PG&E's pipeline safety to this new level. They are consistent with and encompass many of the NTSB's recommendations and include four main components:

- Pipeline Modernization
- Valve Automation
- Pipeline Records Integration
- Interim Safety Enhancement Measures

The PSEP has two phases. Phase 1, which has already begun, will carry through 2014. It targets pipeline segments that are in highly populated urban areas, have vintage seam welds that do not meet modern manufacturing, fabrication, or construction standards or were "grandfathered" under previous regulations, and have not been strength tested. During this phase, PG&E plans to replace 186 miles of transmission pipelines, strength test more than 780 miles, retrofit about 200 miles to

permit in-line inspections, and in-line inspect over 200 miles. In addition, 228 valves will be replaced with automated valves. In Phase 2, PG&E will expand the program to cover the remainder of our gas transmission system.

The PSEP is currently pending before the CPUC, where stakeholders have the opportunity to comment on what we have proposed. We are hopeful that the CPUC will issue a final decision in the first quarter of next year. In the meantime, we continue to move forward with actions to enhance the safety of our system and to take steps to prevent another accident like San Bruno from occurring.

I would like to thank the Committee for providing me with the opportunity to appear and provide testimony at this very important hearing. I would be pleased to answer any questions that members of the Committee may have.

ATTACHMENT A
PG&E ACTIONS RELATING TO NSTB SAFETY RECOMMENDATIONS

I. Records, Maximum Allowable Operation Pressure (MAOP) Validation, and Strength Testing (NTSB P-10-2, P-10-3, and P-10-4)

Summary of Safety Recommendation: (1) Diligently search for traceable, verifiable and complete records for transmission pipelines in class 3 and 4, and class 1 and 2 high-consequence area (HCA) locations for which the MAOP has not been established by a pressure test; (2) calculate valid MAOP for such transmission pipelines based on those traceable, verifiable and complete records; and (3) establish a valid MAOP by hydrostatic pressure test for any transmission pipelines for which the MAOP cannot be validated by steps (1) and (2).

PG&E Actions Related to Safety Recommendations:

- MAOP Validation Project: Validated the MAOP for more than 750 miles of high priority pipelines in HCAs without prior strength tests. MAOP validation work will continue on all remaining HCA pipelines in 2011 and the first part of 2012 with work commencing on all non-HCA pipelines thereafter.
- Strength Tests: Strength testing between 144 and 160 miles of pipeline in 2011. As of September 30, more than 85 transmission pipeline miles have been hydrostatically tested or replaced.
- Video Inspections: Video inspected approximately six miles of pipe in various locations throughout the transmission system.
- Specialized In-Line Inspection (ILI) Tools: PG&E will have retrofit nearly 1,000 miles of pipe to accommodate ILI tools through 2011. By the end of 2014, PG&E expects to have a total of approximately 1,480 miles of the gas transmission pipe retrofitted to accommodate ILI tools.
- Pipeline Safety Enhancement Plan: Ultimately PG&E will pressure test all transmission lines not previously tested, including strength testing on 783 miles of pipe in Phase 1 of the program and replacing 186 miles of pre-1970 pipe (single-submerged arc welded ("SSAW"), low frequency electric resistance welded ("LF-ERW), joint efficiency ("JE") < 1.0) in High Consequence Areas in Phase 1 of the program.
- Interim Safety Measures: Reducing pressure in some pipelines to ensure an adequate margin of safety until MAOP is validated through on-going and future corrective action, such as records validation, pressure tests or pipe replacement. Currently, pressure has been reduced on 29 primary pipelines totaling approximately 1,600 miles.

II. 911 Notification by Gas Control (NTSB P-11-3)

Summary of Safety Recommendation: Requires gas control room operators to notify immediately and directly 911 emergency call center(s) for affected communities when a possible rupture of any pipeline is indicated.

PG&E Actions Related to Safety Recommendations:

- Gas Control Room: As addressed in PG&E's August 26, 2011 response to Safety Recommendation P-11-3, PG&E has established and implemented a Gas Control Room Process (911 Notification Process) in response to this

NTSB recommendation. The new 911 notification process 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.

- Related and continuing actions include:
  - Gas System Operators: Gas System Operators to take the lead to further assess best practices for emergency response and 911 contacts in connection with pipeline events.
  - Outreach and Partnering: Outreach to and partner with 911 agencies to determine best practices to give and receive information to establish situational awareness so that all first responders, utility and agencies are in unified command; ultimate goal to reduce response time and thereby improve opportunity to safeguard the public.
  - Gas Dispatch and Gas Control: Evaluate possible co-location of Gas Dispatch and Gas Control to facilitate information sharing; consider establishing collaborative process whereby Gas Control determines need to call 911 and Dispatch initiates communications at Gas Control's direction.
  - GPS Locators: Evaluate GPS locators on every PG&E first responder vehicle with real-time visibility to Dispatch and Gas Control.
  - Distribution Gas Control and Transmission Gas Control: Establish a Distribution Gas Control center separate from Transmission Gas Control.

III. Work Clearance Procedures and Supervisory Control (NTSB: P-11-24, P-11-26)

Summary of Safety Recommendations: (1) Include requirements for identifying the likelihood and consequence of failure associated with the planned work and for developing contingency plans; (2) Equip supervisory control and data acquisition (SCADA) system with tools to assist in recognizing and pinpointing the location of leaks, including line breaks; such tools could include a real-time leak detection system and appropriately spaced flow and pressure transmitters along covered transmission lines.

PG&E Actions Related to Safety Recommendations:

- Comprehensive Controls Framework: Developing and implementing a comprehensive controls framework consisting of industry best practices. This framework will focus on proactive practices to assess, prevent, detect and respond to potential threats (e.g. physical, logical, and personnel) to PG&E's system. Areas of focus include access control for both the Industrial Control Systems (ICS) and underlying infrastructure; training of operators on proper use of controls and reporting; enhanced monitoring of controls and system configuration; independent assessments; and business continuity and disaster recovery capabilities.
  - Subject Matter Experts: Identified subject matter experts knowledgeable in ICS, Geographic Information System (GIS), Information Technology (IT), and related security controls and incorporated their expertise

- Standardized Procedures: Establishing standardized procedures to effectively deal with abnormal and emergency operating situations. Examples include: station start-up, operational protocols, electrical maintenance, controls construction, and the retention and accessibility of critical station documentation.

- Quality and Accessibility of Information: Improving the quality of information available to operators by providing increased pipeline pressure and flow information.
- Alarm Management Systems: Upgrading alarm management software systems to improve alarm analysis.

IV. Emergency Response (NTSB: P-11-25)

Summary of Safety Recommendation: Establish a comprehensive emergency response procedure for responding to large-scale emergencies on transmission lines.

PG&E Actions Related to Safety Recommendations:

- Increased SCADA Capability: Updating and expanding SCADA system by installing more pressure and flow monitoring points; deploying real-time and situational SCADA viewing tools to improve gas control monitoring and response abilities; developing new shut-down protocols for emergency response.
- Benchmarking: Incorporating information gained from benchmarking with 25 other utilities and first responders to identify best practices and industry standards.
- Enhanced Emergency Response Capability: Organizational changes to support emergency planning and response and implementation of mobile command centers.
- Training and Outreach:
    - Developed contact list for all local first responders to facilitate future communications and notifications
    - Launched PG&E first responder password-protected website
    - Provided maps, GIS data and other information to first responders
    - PG&E completed in-house Incident Command System training and regionally-based training for fire departments and other agencies in coordination with PG&E employees
    - PG&E is conducting Gas Controller training regarding the use of automated isolation valves in emergency response
    - PG&E also plans to improve processes for dispatching first responders to the scene of a natural gas emergency (See actions taken in response to NTSB P-11-3 above)

V. Installation of Automated Valves (NTSB: P-11-27)

Summary of Safety Recommendation: Expedite the installation of automatic shutoff valves and remote control valves on gas transmission lines in HCAs, and in class 3 and 4 locations, and space them at intervals that consider the factors listed in Title 49 *Code of Federal Regulations* 192.935(c).

PG&E Actions Related to Safety Recommendations:

- Isolate or Shutdown Pipe Segments: Install automated and remotely operated pipeline safety valves to enable PG&E's to isolate or shutdown pipeline segments in an emergency.
- Automated Valves and SCADA: Installed automated valves and SCADA capability at Line 132/109 cross-ties.
    - Automating 29 valves in 2011 on the San Francisco Peninsula.

- Planning to install a total of 228 automated valves over the next three years as part of PG&E's proposed Pipeline Safety Enhancement Plan.

VI. Post Accident Toxicological Testing (NTSB: P-11-28)

Summary of Safety Recommendation: Revise PG&E's post accident toxicological testing program to ensure that testing is timely and complete.

PG&E Actions Related to Safety Recommendations:

- Post-Accident Training: Conducted Department of Transportation (DOT) Gas Post-Accident training to all PG&E'S Gas Maintenance & Construction management team and first-line supervisors.
- Procedures, Controls and Training: Clarified procedures, established controls and ongoing training of the on-call procedure binder, procedural checklist and DOT contact; conducted DOT training on July 18, 2011 for all supervisors and on-call engineers.

VII. Integrity Management Program (NTSB: P-11-29, P-11-30, P-11-31)

Summary of Safety Recommendations: (1) Assess every aspect of Integrity Management program and implement a revised program; (2) conduct assessments using revised risk analysis methodology incorporated in (1) and report results to the CPUC; (3) develop and incorporate into public awareness program written performance measurements and guidelines for evaluating the plan and for continuous program improvement.

PG&E Actions Related to Safety Recommendations:

- Review and Modify Integrity Management Program:
  - Conducting a comprehensive review of Gas Transmission Integrity Management Program
  - Benchmarking Integrity Management Program against industry leaders
  - Updating prioritization methods to incorporate structured risk assessment across facilities and functions.
- Improving Integrity Management Program Through Records Management: Establishing a technology infrastructure to ensure data reliability, improve risk and integrity management, strengthen record and data analysis, and aid in decision-making.
- Training: Providing additional training to ensure employees can execute and meet highest standards related to PG&E's Integrity Management Program.
- Quality Assurance: Established clear audit and review procedures to ensure work is:
  - Performed according to established standards
  - Improvement actions identified through audits are effectively implemented and tracked