Pacific Gas and Electric Company

Christopher P. Johns
President

77 Beale Street
San Francisco, CA 94105
Mailing Address
Mail Code B32
P.O. Box 770000
San Francisco, CA 94177

415.973.7000

December 22, 2011

Honorable Deborah A.P. Hersman
National Transportation Safety Board
490 L'Enfant Plaza, SW
Washington, DC 20594

Re: NTSB Safety Recommendations P-11-24 through-31

Dear Chairman Hersman:

Pacific Gas and Electric Company (PG&E) has fully embraced the safety recommendations outlined by the National Transportation Safety Board (NTSB) as part of the agency's review of the September 2010 San Bruno pipeline accident. We at PG&E recognize the importance of preventing a tragedy like this from ever happening again, and we are grateful for the NTSB's guidance toward that goal.

As requested in your September 26, 2011 letter, we are providing an update on the actions PG&E is taking, and the plans that are in place to implement the NTSB's thoughtful and thorough recommendations.

These recommendations have prompted PG&E to take significant actions on many fronts, including pipeline leak and break identification, emergency response, integrity management, threat assessments, public awareness of pipeline safety measures, and recordkeeping.

The NTSB's recommendations have helped propel PG&E to make fundamental changes to our operations and management—all intended to underscore our commitment to putting public and employee safety first.

For example, we've completed Maximum Allowable Operating Pressure validation of more than 1,600 miles of high consequence area pipelines, with plans to complete all 2,000 miles by the end of January 2012. We are implementing a new data management system intended to address the NTSB's recommendations for traceable, verifiable and complete records.

Additionally, PG&E has automated 11 shutoff valves in 2011. As part of the company's Pipeline Safety Enhancement Plan, which was presented for approval to the California Public Utilities Commission this year, PG&E has proposed automating a total of 228 valves through 2014. We've also updated our emergency response plans to reflect industry best practices and have begun training employees, public officials and first responders. In an effort to improve public gas

safety awareness, we've mailed more than two million safety information letters to customers who live within 2,000 feet of a transmission pipeline.

We realize we still have much to learn and do in the wake of the tragic San Bruno accident. As you'll see in the attachment, we have completed several of the recommendations and are in mid-stream on the remainder. We're working with urgency to complete all of the recommendations and we remain steadfast in our commitment to safety and to regaining the trust of the public and our regulators.

The attachment to this letter provides a more detailed summary of each NTSB recommendation and the steps we are taking to act upon them.

If you have any questions, please contact me directly.

Sincerely,

Christopher P. Johns

Attachment

NTSB Safety Recommendations -- PG&E's Actions

1. Work Clearance Procedures and Supervisory Control

P-11-24: Revise your work clearance procedures to include requirements for identifying the likelihood and consequence of failure associated with the planned work and for developing contingency plans.

P-11-26: Equip your supervisory control and data acquisition 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.

- **Developing Comprehensive Controls Framework**

  PG&E is currently evaluating information technology solutions to deliver the right information to operators to allow them to make prompt, informed decisions related to pipeline safety. PG&E is incorporating Lean Six Sigma improvement processes from a variety of internal stakeholders and industry consultants to ensure a solution focused on interoperability and usability. Examples include:

  - Beginning the establishment of a new Distribution Control Center to expand visibility and control capability of the distribution system.
    - The new Distribution Control Center will work in tandem with the existing Transmission Control Center function.
    - PG&E will take best practices and findings from internal assessments and external benchmarking to create a leading class distribution control center that oversees planning and execution of critical distribution system enhancements, and monitors work on the distribution system. It will also include low-power consumption solutions for gathering SCADA data from remote gas distribution assets.
  - Ensuring that both the Transmission and Distribution control centers will be supported by a common SCADA and real-time Data Historian platform, an enhanced clearance process, and integration with the Gas Dispatch and Emergency Response organizations.
  - Nearing completion of a SCADA modification project as a major step in implementing an alarm management process.
    - This SCADA enhancement will prioritize alarms for appropriate operator action upon activation.
    - In conjunction with the new alarm management strategy, PG&E is working with human factors consultants to develop a new SCADA visual coding design, including use of color, text and symbols in graphic displays to present alarm status and data quality. The new design will meet the requirements of API 1165 (Graphic Standard, Recommended Practice for Pipeline SCADA Display) by August 2012. This modification will prioritize alarms on Operators' operating screens.

- As the initial step to prioritize SCADA alarms, PG&E is building template response forms to be used by control room operators, including alarm priority, for each group of SCADA data, based on impact on safety, severity of consequence, and response required.

PG&E has:

- Successfully completed emergency backup relocation exercises for critical parts of Gas Operations and a winter emergency curtailment training in late November.
- Commissioned a new enterprise-wide Data Historian system that will be used to pull key relevant data together for operator and planning team use, and display material to operators on large screens in the control room. This platform will rapidly provide near real-time information to all areas of the Gas Operations organization, including engineering, planning, maintenance, and operations. This will provide better guidance and inputs for remote monitoring and controls, as well as real-time operations.

- **Standardizing Procedures**
  - The transmission work clearance process is being reviewed and improved to include contingency plans for clearances which will include identifying the likelihood and consequence of failure associated with planned work. A comprehensive and consistent clearance process for the distribution system is also being developed.
  - PG&E has deployed via a Control Room Management (CRM) rollout, roles and responsibilities for control room operators to transition over the next several months to geographic-based control room operating consoles.
  - Roles and responsibilities are in place to support a new SCADA change management process ensuring proper review and implementation of work done on PG&E's SCADA and Data Historian systems. Across winter operations planning, emergency response and planned outage processes, PG&E's policies, protocols, and procedures are being documented and revised to reflect best practice approaches and to clarify roles and responsibilities of those involved.
  - Cross-functional group discussions and table top exercises are being held to practice and refine documented procedures for abnormal and emergency operating situations.

2. Emergency Response

P-11-25: Establish a comprehensive emergency response procedure for responding to large-scale emergencies on transmission lines; the procedure should:

1) *identify a single person to assume command and designate specific duties for supervisory control and data acquisition staff and all other potentially involved company employees;*
2) *include the development and use of trouble-shooting protocols and checklists; and*

3) *include a requirement for periodic tests and/or drills to demonstrate the procedure can be effectively implemented.*

A new Public Safety and Integrity Management team has been formed and is actively engaged in various facets of operational planning. Responsibilities of this team include maintenance of the Gas Emergency Response Plan to assist PG&E personnel in responding safely, efficiently and in a coordinated manner to emergencies affecting gas transmission and distribution systems. The plan describes roles and responsibilities of PG&E's emergency response personnel. Roles and responsibilities include the following:

1. A single person that assumes command and designates specific duties for supervisory control and data acquisition (SCADA) staff and all other potentially involved company employees will vary depending on the complexity of the emergency. In general, command will move to a higher level employee with increasing complexity as follows:

    a. If there is an event on the pipeline, the person initially in control in the Control Room is the Sr. Transmission Controller. This individual is very experienced and has access to all pipeline information including alarm data and volume and pressure data.
    b. If the event escalates, the Operations Emergency Center (OEC) in the division is activated and an incident commander is in place to manage the field operations and to coordinate with gas control.
    c. If it escalates further, the Emergency Operations Center (EOC) is activated and the incident commander of the EOC is the single person in charge.
    d. As we implement plans for a co-located control center (active in first quarter 2013), all information -- from transmission control, distribution control, and gas dispatch -- will be in one place. Command and control will be facilitated by this arrangement. Interaction with the EOC will still occur and we will have to define the escalation path and the command hand offs.

2. PG&E's gas control team provides inputs and guidance regarding project requirements to ensure the proper SCADA equipment is deployed and control settings are enacted. Implementation of a robust near-real-time Data Historian system will occur in control rooms and will also be available to emergency response teams, allowing enhanced situational awareness by those involved in emergency events.

3. The following training and exercises have been completed. Measures have been utilized to evaluate the effectiveness of these programs.

    a. PG&E has conducted training exercises with public officials and first responders to simulate gas curtailment scenarios and build greater understanding of how to prepare for potential events
    b. Increased the number of educational and interactive sessions, including practice drills, with first responders to meet demand and prepare for gas-related emergencies.

c. Established a first responder pilot training program with the City of San Francisco and City of Fremont to share critical information with first responders.
d. Developed contact list for all local first responders (~1,800) to improve future communications and notifications
e. Launched PG&E first responder website portal
f. Conducted CAISO Gas Curtailment Exercise in August, 2011
g. Provided maps, GIS data, and other information to first responders
h. Completed Incident Command System training
i. Established and implemented a Gas Control Process (911 Notification Process) in August 2011 in response to the NTSB's recommendation P-11-3.

3. Automatic Shutoff and Remote Control Valves:

P-11-27: Expedite the installation of automatic shutoff and remote control valves on transmission lines in high consequence areas 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 is modernizing its system and using technology to help identify potential issues and address them quickly. Examples include:
  - Automated 11 shutoff valves in 2011 and a proposed total of 228 will be installed by the end of 2014 as part of PG&E's Pipeline Safety Enhancement Plan.
  - Enhancing the SCADA information system by including additional information related to pipeline pressures, valve position and gas flow rates.
  - The Company will be in compliance with any new requirements as established by a revised Pipeline Safety Act now pending approval by the White House.

4. Toxicological Testing

P-11-28: Revise your post accident toxicological testing program to ensure that testing is timely and complete.

- PG&E conducted Department of Transportation (DOT) Post Accident Training for first line supervisors of the Gas Maintenance and Construction team in June 2011. PG&E also created a cross department team to collaborate on ongoing improvements to the DOT process to ensure all reportable gas and commercial-related accidents/ incidents are communicated to the DOT within two hours, but not to exceed eight hours. PG&E will revise its procedures to comply with any revisions to the Pipeline Safety Act which may require accident or incident notification at the earliest practicable moment, following confirmed discovery of an accident or incident and not later than 1 hour following such confirmed discovery.

- In addition, PG&E has updated job tools and expanded responsibilities to ensure DOT compliance. For example, the on-call engineer is notified of all gas incidents/accidents and will be responsible for reaffirming DOT post accident criteria. DOT contact information is now included in the procedural checklist of the Emergency On-Call Binder. PG&E communicated the updated roles and made the new resources available to supervisors, managers and directors in July 2011.

5. Integrity Management Program

P-11-29: Assess every aspect of your integrity management program, paying particular attention to the areas identified in this investigation, and implement a revised program that includes, at a minimum,

1. *a revised risk model to reflect the Pacific Gas and Electric Company's actual recent experience data on leaks, failures, and incidents;*
2. *consideration of all defect and leak data for the life of each pipeline, including its construction, in risk analysis for similar or related segments to ensure that all applicable threats are adequately addressed;*
3. *a revised risk analysis methodology to ensure that assessment methods are selected for each pipeline segment that address all applicable integrity threats, with particular emphasis on design/material and construction threats; and*
4. *an improved self-assessment that adequately measures whether the program is effectively assessing and evaluating the integrity of each covered pipeline segment.*

PG&E has embarked on a complete assessment of every aspect of its integrity management program. At the core of this effort is a major restructuring of the organization responsible for the program. A key aspect of the reorganization is the formation of a team solely dedicated to integrity management associated with the company's transmission assets. In addition, PG&E has hired a number of consultants recognized and respected in the industry as experts in integrity management to assist in an exhaustive review of our program's policies, procedures and tools. Also, we are working collaboratively with the newly formed Asset Knowledge Management group to improve system records and work management systems to fully integrate the use of pipeline system as-built and maintenance information into the revitalized integrity management program. This work includes:

1. Revisions to PG&E's risk model are being initiated to include a more comprehensive integration of leak history, failure analysis and incident investigations.

2. Risk analysis algorithms are foundational to PG&E's risk analysis methodology. These tools are being enhanced through engagement of several consultants who will further evaluate various threats including: internal corrosion, stress corrosion cracking, manufacturing, construction and cyclic fatigue failure threats

3. Developing aids for selecting assessment methodologies to ensure that all applicable integrity threats are being considered for each pipeline segment which include human performance errors, with particular emphasis on design/material and construction threats.

4. Developing public safety metrics that include performance measures of the integrity management program. Two audits of PG&E's Transmission Integrity Management Program (TIMP) were conducted during 2010 and 2011. Preliminary results of these audits are as follows:

    - 2010 TIMP California Public Utilities Commission (CPUC) Audit

        - PG&E's TIMP program was audited by the CPUC in May 2010. The scope of the two week audit was the Pipeline and Hazardous Materials Safety Administration (PHMSA) TIMP audit protocols. The CPUC letter and findings were issued in Oct. 2010. PG&E responded in Dec. 2010 and committed to 41 corrective actions in response to their findings.

        - Forty of the 41 corrective actions have been completed. The remaining outstanding action will be completed by the end of 2011.

    - 2011 TIMP CPUC/PHMSA Audit

        - PG&E's TIMP program was audited by the CPUC and PHMSA in April 2011. The scope of this four day audit was PHMSA Protocol C, which is risk and threat identification. PG&E has not received a final letter yet.

6. Threat Assessment

P-11-30: Conduct threat assessments using the revised risk analysis methodology incorporated in your integrity management program, as recommended in Safety Recommendation P-11-29, and report the results of those assessments to the California Public Utilities Commission and the Pipeline and Hazardous Materials Safety Administration.

- PG&E has hired several consultants to assist in creating new risk identification procedures for the following threats: manufacturing, construction, internal corrosion, stress corrosion cracking, incorrect operations, and interacting threats.

- The manufacturing and construction threat identification procedures, including an analysis of its application, have been completed.

- Completion of these analysis tools is expected during the 2nd quarter of 2012. Completion of this work will be reported to the California Public Utilities

Commission and Pipeline and Hazardous Materials Safety Administration as soon as administratively possible during that quarter.

7. Public Awareness Program Continuous Improvement

P-11-31: Develop, and incorporate into your public awareness program, written performance measurements and guidelines for evaluating the plan and for continuous program improvement.

- Developed written public awareness performance measurements and guidelines for evaluating the plan and for continuous improvement.
- Developed performance measures which will be filed with the CPUC by 2/1/12.
- 2011 PHMSA and CPUC Audit of PG&E's Public Awareness Program made recommendations to enhance the public awareness plan, and recognized positive attributes of program.

8. Records

P-10-2 (Urgent): Aggressively and diligently search for all as-built drawings, alignment sheets, and specifications, and all design, construction, inspection, testing, maintenance, and other related records, including those records in locations controlled by personnel or firms other than Pacific Gas and Electric Company, relating to pipeline system components, such as pipe segments, valves, fittings, and weld seams for Pacific Gas and Electric Company natural gas transmission lines in class 3 and class 4 locations and class 1 and class 2 high consequence areas that have not had a maximum allowable operating pressure established through prior hydrostatic testing. These records should be traceable, verifiable, and complete.

- PG&E has completed an aggressive and diligent search for as-built drawings, alignment sheets, and specifications, and design, construction, inspection, testing, maintenance, and other related records for 2,000 miles of pipelines located in high consequence areas.
    - This also includes searching for records in locations outside of PG&E. related to pipeline system components, such as pipe segments, valves, fittings, and weld seams for Pacific Gas and Electric Company natural gas transmission lines in class 3 and class 4 locations and class 1 and class 2 HCAs that have not had an MAOP established through prior hydrostatic testing.

9. MAOP Validation

P-10-3 (Urgent): Use the traceable, verifiable, and complete records located by implementation of Safety Recommendation P-10-2 (Urgent) to determine the valid maximum allowable operating pressure, based on the weakest section of the pipeline or component to ensure safe operation, of Pacific Gas and Electric Company natural gas transmission lines in class 3 and class 4 locations and class 1 and class 2 high consequence areas that have not had a maximum allowable operating pressure established through prior hydrostatic testing.

- PG&E met its June, July and August CPUC deadlines related to records verification and MAOP validation of 760 miles of pipeline in HCAs
- More than 1600 miles of pipeline in HCAs in PG&E's service territory have undergone records verification and MAOP validation.
- PG&E is on track to complete records verification and MAOP validation for all pipelines in HCAs (estimated to be more than 2,000 miles) by the end of January. 2012.

10. Spike and Hydrostatic Testing

P-10-4: If you are unable to comply with Safety Recommendations P-10-2 (Urgent) and P-10-3 (Urgent) to accurately determine the maximum allowable operating pressure of Pacific Gas and Electric Company natural gas transmission lines in class 3 and class 4 locations and class 1 and class 2 high hydrostatic testing, determine the maximum allowable operating pressure with a spike test followed by a hydrostatic pressure test.

- In 2011, PG&E hydrostatically tested, replaced or verified strength test pressure records for about 144 of the 152 Priority 1 transmission pipeline miles with similar characteristics to the line that failed in San Bruno.
- A total of 163.6 miles was tested in 2011.
- PG&E plans to hydrostatic pressure test approximately 185 miles in 2012, 204 miles in 2013 and 158 miles in 2014.