CITY OF SAN BRUNO
CITY MANAGER

June 17, 2011

Ravindra Chhatre
Investigator-in-Charge
Office of Railroad, Pipeline and
Hazardous Materials Investigations
National Transportation Safety Board
490 L'Enfant Plaza, S.W.
Washington, D.C. 20594

Re: City of San Bruno Submittal, Investigation San Bruno, CA-DCA10MP008

Dear Mr. Chhatre:

The City of San Bruno thanks the National Transportation Safety Board (NTSB) for the rapid launch and continuing thorough investigation of the tragic September 9, 2010 pipeline explosion in our community. We appreciate the opportunity for the City to participate as a party to the investigation. In that capacity, we further appreciate the opportunity to provide this submittal setting forth the City of San Bruno's comments, conclusions and recommendations.

The City is concerned about the several critical safety issues that have been identified through the investigation and we believe that these need to be thoroughly addressed by the NTSB. We remain confident that the final investigation report will address these issues and we look forward to joining you again in Washington D.C. at the conclusion of this process to hear the final investigation report and the Board's deliberations.

On behalf of our residents, the City has a vested and continuing interest in pipeline safety arising from the devastating pipeline explosion and fire that took place in San Bruno on September 9, 2010. This is especially true considering the fact that three pipelines continue to carry high-pressure natural gas through heavily populated residential areas of San Bruno, other parts of the Peninsula and the Bay Area generally. The City is aware that the NTSB is familiar with the devastating tragedy resulting from explosion, but the facts bear repeating.

The explosion caused the loss of eight lives that horrific evening. We believe that this fact-finding process and the investigation itself must remain fixed to that deadly result. Sixty-six persons were burned and injured. Many of these victims continue to face long and difficult recoveries. Thirty-eight homes were destroyed and another seventeen were

seriously damaged; they remain uninhabitable today. Sixty more homes suffered less serious damage. A peaceful and quiet neighborhood was destroyed and our residents' basic sense of safety and security in their own homes was shattered.

Even now, some nine months since this incident, the San Bruno community continues to cope with the irreparable losses we have experienced as a result of this tragedy. Even as the victims work to rebuild their homes and their lives, they and San Bruno residents generally are acutely aware that there is still a long and difficult road to full recovery. That recovery includes a commitment by the City of San Bruno and the San Bruno community to do what it can to assure that what happened here does not happen again anywhere, ever.

Summary of Issues and Precipitating Causes

It is the City's position that this explosion was not an isolated incident, and it was not just an anomaly.

The NTSB's fact-finding process and the revelation of the precipitating causes demonstrate that there are systemic and pervasive problems with Pacific Gas and Electric Company's (PG&E's) integrity management program, its record-keeping, its safety and emergency operation procedures, and its operation of gas transmission pipelines. Therefore, the NTSB's fact-finding process will help ensure that these deficiencies are corrected and that catastrophic failure never happens again by addressing the necessary and appropriate actions and oversight required to protect the safety of our City's residents and that of residents throughout the State of California.

The City believes that there were numerous contributing and precipitating causes that led to the rupture of Line 132. These are summarized as follows:

- The segment of Line 132 that failed on September 9, 2010 was constructed using inferior steel and unusually configured pipe segments that were never intended to be used in the construction of a high-pressure gas transmission pipeline.

- Post construction inspection and testing programs were not adequate to identify the deficiencies before the pipeline ruptured. This was due in part to the absence of verifiable as-built records. This unusually configured pipe segment and improper welding caused the material failure.

- PG&E used an unusual practice that is not accepted within the industry of spiking the operating pressure above the highest actual operating pressure to which the line was subjected during the preceding five years to maintain the Maximum Allowable Operating Pressure (MAOP) for Line 132 in high consequence areas (HCAs). The City believes that PG&E's interpretation of Federal pipeline safety regulations for determining the MAOP for older pipeline systems, the so called "grandfather provisions," resulted in the actions by PG&E to periodically spike

pressure on the pipeline system. This spiking of pressure created cyclical pressurization stresses in Line 132 that led to the propagation of existing weld defects and ultimately, to failure.

- Subsurface geologic conditions in the vicinity of the failed portion of Line 132 were known to PG&E as long ago as 1992 and such accumulated geologic stresses could have further weakened defective welds.

- Deficiencies in PG&E's record-keeping, documentation and integrity management programs contributed to the company's failure to identify and address deficiencies in the transmission pipeline system.

- The loss of pressure control at the Milpitas station minutes before the explosion spiked the pressure in Line 132 such as to ultimately precipitate the final catastrophic failure. Inadequate maintenance and control room coordination, protocols and/or procedures during maintenance activities at the control station upstream of the accident site likely resulted in inadequate management of Line 132 and acted as contributing cause that triggered the pipeline rupture. It appears that the control room operators were not properly alerted to the pressure increase and/or the loss of pressure. Consequently, the controllers were unable to take the necessary action to prevent or to mitigate the conditions that triggered the rupture.

- Complete absence of remote control valves and automatic shut-off devices along with the lack of timely identification of the rupture location and response permitted the fire to consume the Glenview neighborhood for over 90 minutes.

Issues and Precipitating Causes Discussion

The NTSB Metallurgical Group Chairman Factual Report confirms the conclusion that the segment of Line 132 that failed on September 9, 2010 was constructed using inferior steel and unusually configured pipe segments that were never intended to be used in the construction of a high-pressure gas transmission pipeline. With respect to the segment of PG&E Line 132 that failed, the segment was fabricated using 6 short pieces of pipe (pups). Specifically, the Factual Report identified consistent weld defects in the longitudinal and girth welds -- including lack of weld penetration, incomplete fusion, slag inclusion, porosity, and undercutting. Unacceptable welds were not identified in the field and were never corrected during, and subsequent to, the pipeline construction job.

The City is concerned that these deficiencies were not identified and corrected during the pipeline construction process and that post construction inspection and testing programs were not adequate to identify the deficiencies before the pipeline ruptured in part due to the absence of verifiable as-built records. We believe that inaccurate historical inventory and as-built records for materials used to fabricate the pipeline has

resulted in unrecognized increased risk for material failure and raises concern about all pipelines constructed by PG&E during this time period.

While accurate as-built records for Line 132 are not available to help the pipeline operator and regulators fully understand how the pipeline was constructed, PG&E used historical operating pressures (the highest actual operating pressure to which the segment was subjected during the 5 years preceding) to determine the MAOP for Line 132 in HCAs. The City is concerned that PG&E's interpretation of Federal pipeline safety regulations for determining the MAOP for older pipeline systems, so called "grandfather provisions," resulted in actions by PG&E to periodically spike pressure on the pipeline system above maximum operating pressure to establish or maintain the MAOP and that spiking pressure on Line 132 may have exposed it to stresses that later led to failure.

The City believes that the NTSB accident investigation report needs to address whether and how often Line 132 exceeded both maximum operating pressure and MAOP in the past 5 years, whether each overpressure condition was reported to the California Public Utilities Commission (CPUC), whether inspections or tests were conducted after overpressure conditions to determine if those conditions resulted in damage to the pipeline, and how other pipelines on the PG&E system also may have been affected by similar procedures. Furthermore, this entire concept of grandfathering should be evaluated when the operator cannot produce as-built specifications for a pipeline segment.

The City does not believe that the pipeline integrity management program requirements adequately address the safety of aging pipeline systems. Older pipeline systems, such as Line 132, are not required to be modified to accommodate in-line inspection tools -- tools that can identify corrosion issues, developing cracks, and poor welds -- and they are not required to be pressure tested to confirm the strength of the pipeline. Yet, these older pipeline systems were constructed using pipe and fabrication techniques that do not compare to the improved methods used in more recent years. Ironically, newer, tougher pipeline systems are subject to stronger inspection requirements than the aging pipeline systems under the Federal integrity management rules.

The City believes that deficiencies in PG&E's record-keeping and documentation practices may have resulted in the company failing to adequately identify and address potential risks in its transmission system that could, and should have been addressed prior to the rupture. PG&E recently disclosed that it identified a leak on Line 132 some 9 miles south of San Bruno in 1988. A portion of the pipeline was replaced to repair the leak. Federal law took effect in December 2004 (CFR 192.907) requiring pipeline operators to establish and maintain an integrity management program to address known risks on each transmission pipeline segment in an HCA. Records of this 1988 event should have been taken into account when PG&E enacted their integrity management program pursuant to the 2004 regulations. Had this known risk to Line 132 been properly addressed in PG&E's integrity management program, a hydrostatic test of Line

132 likely would have been required. Given the construction deficiencies on the pipeline, it is likely that Line 132 would have failed this test.

In 1992, as part of the review for a proposed relocation of PG&E's Line 109 in San Bruno, the company prepared a report titled "Geologic Hazard Evaluations for Gas Transmission Lines 109 and 132 in San Bruno". In its discussion of relocation of Line 109, this report concluded that there were sufficient subsurface conditions present in the pipeline right of way to warrant special treatment using "special heavy-wall/ductile pipe (0.5 inch wall thickness) at this locality" to strengthen Line 109 if it were placed along side the existing Line 132 at the intersection of Earl and Glenview. The relocation of Line 109 to this location did not occur. Although the report does not specifically address the condition of Line 132, its analysis and conclusion regarding the need for special treatment of Line 109 through this location should have been sufficient to raise a serious concern for the need to investigate and replace or improve Line 132.

The City strongly believes that the NTSB accident investigation report needs to address the relationship between maintenance activities performed at the upstream control station immediately prior to the accident, the adequacy of maintenance and control room coordination, the adequacy of operating procedures and protocols, and the actions of personnel in the control room during those maintenance activities. The accident investigation report should address how the maintenance activities affected pressure within the pipeline; the adequacy of actions by control room personnel to maintain a safe operating condition for the pipeline, both before and after pressure readings on the system were lost at some locations; the adequacy of maintenance procedures and control room procedures to ensure that the maintenance activities did not adversely affect the safety of the pipeline; and, if any of these factors resulted in a pressure increase or other unsafe condition that triggered the rupture.

After the pipeline ruptured, controllers were not able to timely confirm the location of the rupture. Additional pressure monitoring devices spaced throughout the pipeline system may have helped pipeline controllers more quickly and accurately pinpoint the rupture location and initiate actions to shut down the flow of gas. Further, PG&E's "boots on the ground" procedure, requiring that a PG&E employee be sent to a location to confirm a pipeline rupture, unnecessarily delayed action to shut down the pipeline. The rupture location on Line 132 was not isolated and the flow of gas shut off until over an hour and a half after the explosion.

PG&E's public awareness program was not effective and did not adequately prepare the community or emergency response personnel for a pipeline emergency. PG&E had not provided the San Bruno Fire Department with detailed maps showing the location of Line 132 and had not provided it important information about the pipeline, such as the size, operating pressure and expected consequences if it ruptured. A fire station was located only blocks away from the pipeline rupture site and firemen were on scene minutes after the explosion. Had PG&E provided better information, coordination and training to the Fire Department before the accident, on scene emergency personnel would likely have quickly recognized that the pipeline had ruptured and been in a

position to quickly provide information to PG&E that confirmed the location. A better public awareness program may also have prompted PG&E to be proactive in contacting San Bruno emergency response personnel for information that it was seeking to confirm the specific location of the failed pipeline.

PG&E's public awareness program did not effectively educate residents who lived near the pipeline or prepare them for an emergency. Although Federal pipeline safety regulations require pipeline operators to have public awareness programs, many residents were not aware of the pipeline near their homes and they certainly were not aware of the size and pressure of the pipeline. A better-informed public also may have been helpful to PG&E after the pipeline ruptured by confirming the location and intensity of the failure. While this was a catastrophic pipeline failure, odors from small leaks, such as corrosion "pin holes," could prompt residents to proactively report safety problems that could be fixed before a catastrophic failure occurs.

The City is concerned about the lack of automatic or remote control valves on Line 132 to isolate failed sections of pipeline in a high consequence area. After the pipeline ruptured, it took over one and one-half hours to isolate the failed section and shut off the flow of gas, and it was several more hours before pressurized gas remaining in the pipeline was consumed by the fire. Strategically located automatic or remote shut-off valves would have significantly reduced the amount of time emergency responders had to wait to begin offensive firefighting measures at the accident site.

INGAA and CPUC Independent Review Panel Reports

The City takes exception to an unsoliticted report submitted to the NTSB for inclusion in the fact-finding process. As you are aware, on May 5, 2011 the Interstate Natural Gas Association of America (INGAA) produced and submitted to the NTSB, a white paper report entitled "Preliminary Analysis of Publicly Available Evidence Supporting a Failure Cause of the PGE San Bruno Incident" (INGAA Report).

The report proposes the following as findings:

1. Both the material and the fabrication welds of the section of pipeline that failed in San Bruno did not meet accepted engineering consensus standards applicable to natural gas transmission pipelines and the PG&E specifications in effect at the time of construction.

2. A hydrostatic pressure test of the pipeline probably would have detected the initial weld seam defect and low material strength of the fabricated pipe section. Fatigue analysis of the failed pipeline section suggests that an external force was necessary to cause further deterioration of the initial longitudinal weld seam flaw.

3. Assuming both that the INGAA analysis is correct and that the public record reflects all material facts, INGAA hypothesizes that the external event that most

likely caused increased stress on the longitudinal weld seam of Pup #1 was a 2008 sewer replacement project.

The City of San Bruno takes great exception to this third finding for the following reasons:

- There is no evidence that INGAA consulted with the City's engineering staff concerning the sewer replacement project or the sewer contractor who performed the sewer replacement project. To that point, the report did not address "best practices" associated with pipe-bursting sewer replacement projects or pipe-bursting technology.

- INGAA is a trade association and PG&E is a member of INGAA. Thus, INGAA's objectivity is in question.

- The City's contractor properly notified PG&E regarding the 2008 sewer replacement work and PG&E inspected the project and raised no objections or concerns regarding the project.

- There has been no independent technical, peer review analysis of the INGAA report or its conclusions.

- The co-author of the "Pipe Bursting Good Practices Manual" for the North American Society for Trenchless Technology concluded that the INGAA report is flawed in its analysis and conclusions.

- The INGAA report makes no reference to the conclusions of PG&E's "Geologic Hazard Evaluations for Gas Transmission Lines 109 and 132 in San Bruno" dated 1992. As discussed previously in this submittal, the analysis in this report could have alerted PG&E's integrity management program to subsurface geologic conditions present in the Line 132 right of way of sufficient concern to warrant improvements to strengthen the pipeline.

- There is nothing in the INGAA report that connects the loss of control and pressure at Milpitas to the failure of Line 132 minutes later.

Additionally, we question whether INGAA would have released this report and its findings and conclusions if its authors knew about the 1988 leak on Line 132 some 9 miles proximate to the San Bruno rupture location. As discussed above in this letter, 2004 Federal integrity management regulations would likely have dictated the completion of a hydrostatic test of the pipeline. According to INGAA's own finding, such a hydrostatic test probably would have detected the initial weld seam defect and low material strength of the fabricated pipe section and led to its replacement long before its tragic and fatal rupture on September 9, 2010.

On June 8, 2011 an ”Independent Review Panel” appointed by the California Public Utilities Commission issued a report and findings regarding the San Bruno pipeline explosion. In addition to making substantive findings and conclusions regarding the multiple corporate and engineering failures of PG&E relative to the fabrication, construction, maintenance and integrity management of Line 132 as the cause of the disaster, the Independent Review Panel adopts without critical analysis, independent engineering evaluation or peer review, the conclusions of the INGAA report referred to above. The City of San Bruno did not participate in the proceedings of the Independent Review Panel and will submit its written comments to the CPUC by July 15, 2011. As the City will explain later in those comments, the City believes that the conclusions of the Independent Review Panel are erroneous, diversionary, and that they fail to address several of the critical issues that the City believes are relevant causal factors to the pipeline explosion.

Proposed Findings and Conclusions

In addition to our discussion of the safety issues addressed above, San Bruno offers the following proposed Findings and Conclusions and proposed Safety Recommendations for the NTSB’s consideration.

1. The pipe segment that failed on September 9, 2010, consisting of 6 short pipes (pups), had extensive weld defects in the longitudinal and girth welds, including lack of weld penetration, incomplete fusion, slag inclusion, porosity, and undercutting, and may never have been intended to be used in a gas transmission pipeline when fabricated.

2. Inaccurate and incomplete records on pipe used to fabricate PG&E Line 132 raise concern about unknown risks that may affect the safety of this pipeline and other pipelines constructed during or near the same time period.

3. The inspection procedure used to assess the adequacy of pipe and welds in Line 132 when it was fabricated failed to identify the significant defects in the multi-pup pipe segment that subsequently failed on September 9, 2010.

4. The absence of as-built drawings and specifications for gas transmission pipelines in conjunction with the uncertainty of post construction inspections requires that special testing protocols be established to assess the condition of the pipelines and any continued use.

5. PG&E’s integrity management program, which did not include in-line inspection tools or hydrostatic pressure tests to assess Line 132, was inadequate and failed to identify the significant weld defects before the pipeline ruptured.

6. U.S. Department of Transportation safety requirements on pipeline integrity management are not adequate to ensure that aging gas transmission pipelines, that cannot accommodate in-line inspection tools or have not been recently

hydrostatically pressure tested, can be operated safely at established operating pressures.

7. Inadequate maintenance and control room coordination, protocols and/or procedures during maintenance activities at the station immediately upstream of the accident site likely resulted in inadequate pressure management of Line 132 and may have triggered the pipeline rupture.

8. Pipelines constructed with new, tougher pipe and improved fabrication techniques, can better withstand operational errors, equipment failures, and unintended pressure increases, and therefore can reduce the risk of a pipeline rupture.

9. Additional pressure monitoring devices on Line 132 would have improved information available to pipeline controllers about the likelihood and location of the pipeline rupture, and prompted controllers to more timely begin actions to shut down the pipeline and isolate the failed section.

10. PG&E's emergency plan that requires the use of its employees on scene to verify that Line 132 ruptured instead of coordinating with on-scene local emergency response personnel to verify the rupture location delayed actions to isolate the section of pipeline that failed.

11. The delay by PG&E to isolate the ruptured section of pipe in Line 132 required Fire Department personnel to delay transitioning its response from a defensive operation to an offensive operation.

12. A specific contact and phone number at PG&E for use by emergency response personnel only when the pipeline accident occurred would have improved initial communications about the accident, and helped PG&E more timely confirm the specific location of the rupture and more quickly isolate the failed section.

13. The PG&E public awareness program was not effective and therefore first arriving emergency response personnel did not immediately recognize that a gas transmission pipeline had ruptured: local emergency response personnel had not been provided a map that identified the location of the pipeline, had not been told about the characteristics of the pipeline (such as size and operating pressure), and had not been warned about what to expect in the event of a rupture.

14. PG&E's public awareness program did not effectively educate residents who lived near the pipeline or prepare them for an emergency.

15. The lack of automatic shutoff valves and/or remote control valves to stop the flow of gas from the ruptured pipeline significantly delayed the Fire Department's ability to change from a defensive operation to an offensive operation and likely resulted in the spread of fire to additional homes.

16. PG&E's emergency plan failed to utilize the resources of initial local emergency responders on scene to confirm quickly the specific location of the pipeline rupture.

Safety Recommendations

The City of San Bruno urges that the NTSB make the following Safety Recommendations as part of its final report.

To the California Public Utilities Commission:

1. Require PG&E to:

   - immediately develop and implement a plan for inspecting the integrity of all longitudinal and girth welds in its gas transmission pipelines in high consequence areas that have not been inspected with appropriate in-line inspection tools,
   - immediately report inspections that indicate weld defects,
   - immediately take action to reduce the risk of a pipeline failure at identified weld defect locations,
   - repair weld defects identified in these pipelines, and
   - maintain reduced pressure at no greater than 80% of maximum allowed operating pressure for all gas transmission pipelines in high consequence areas that have maximum operating pressures determined using grandfather provisions.

2. Require PG&E to conduct in-line inspections or hydrostatic pressure tests on all gas transmission pipelines that are in high consequence areas that have not had such inspections or tests completed in conjunction with its pipeline integrity management program.

3. Require PG&E to develop and implement a plan to replace all gas transmission pipelines in high consequence areas for those pipelines that cannot accommodate in-line inspection tools or which it is determined to not be practical to hydrostatically pressure test and consider as a required alternative the replacement of all pre-1970 lines in high consequence areas.

4. Require PG&E to install automatic shutoff or remote control valves on gas transmission pipelines in high consequence areas at intervals necessary to timely isolate a failed section of pipeline.

5. Require PG&E to improve its pipeline public awareness program with local emergency responders by providing emergency responders in each community a current map (or access to a current electronic map), in sufficient detail, of the location of all of its pipelines in the community; ensure that the local responders

understand the characteristics of each pipeline, such as size and operating pressure, and the consequences that may be expected if the pipeline fails; and, follow-up with each community on a regular basis to enhance awareness and to ensure that emergency responders have current information.

6. Require PG&E to establish an independent process to evaluate, on a regular and recurring basis, the effectiveness of its public awareness program.

7. Evaluate PG&E's maintenance, pipeline operation, and control room procedures, to determine:

   - the adequacy of coordination and protocols between pipeline maintenance activities and control room operations;
   - the adequacy of maintenance and control room procedures during maintenance activities to manage pressure in a pipeline and prevent undesired pressure from damaging the pipeline;
   - the adequacy of the control room operating system to alert controllers to pressure increases or loss of pressure management conditions and procedures to prompt controllers to take action necessary to prevent unsafe conditions that could trigger a rupture or otherwise damage a pipeline; and
   - required changes needed to ensure the safe operation of its pipelines.

<u>To Pacific Gas and Electric Company:</u>

8. Improve your pipeline public awareness program with local emergency responders by providing emergency responders in each community a map (or access to an electronic map), in sufficient detail, of the location of all of your pipelines in the community; and, ensure that the local responders understand the characteristics of each pipeline, such as size and operating pressure, and the consequences that may be expected if the pipeline fails.

9. Improve your pipeline public awareness program for residents and businesses located along your right-of-ways to ensure that they understand the location and characteristics of the pipelines, how to identify possible leaks, and how to report the information to emergency response agencies and PG&E; include a process for evaluating the effectiveness of the program, determining if the information is reaching the intended people, and if the information provided is effective, meaningful, and helpful to those receiving it.

10. Review and modify as appropriate your plan and procedures for confirming the specific location of a gas transmission pipeline rupture, so that a failed section of a pipeline can be timely isolated. And, determine how best to use the assistance of emergency responders and the public to provide information on the specific location and consequences of a pipeline failure.

11. Establish a 24 hours a day -- 7 days a week point of contact and phone number for emergency responders to report a gas pipeline emergency, so that they can timely reach appropriate personnel and so that wide spread public use of the phone number does not deny emergency responders access.

To the U.S. Secretary of Transportation:

12. Determine if the California Public Utilities Commission is effectively implementing a pipeline safety program that ensures pipeline operators are complying with minimum Federal pipeline safety regulations and requirements; require corrective action to address any identified deficiencies.

To the U.S. Department of Transportation Inspector General:

13. Determine if the Pipeline and Hazardous Materials Safety Administration has an effective oversight program to ensure that the California Public Utilities Commission is effectively implementing a pipeline safety program that ensures pipeline operators are complying with minimum Federal pipeline safety regulations and requirements.

Again, the City of San Bruno appreciates the opportunity to provide this submission and looks forward to the completion of NTSB's accident investigation report.

Sincerely,

Connie Jackson
City Manager

cc: Honorable Deborah A. P. Hersman, Chairman
Honorable Christopher A. Hart, Vice Chairman
Honorable Robert L. Sumwalt, Member
Honorable Mark R. Rosekind, Member
Honorable Earl F. Weener, Member