



## Report to the Mayor and City Council on PG&E gas lines in Milpitas

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Prepared by :

Brian Sturdivant, Fire Chief  
Greg Armendariz, Public Works Director  
Sean Simonson, EOC Manager

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## Executive Summary

The Mayor and Council, at its October 3, 2010 meeting, in light of the recent San Bruno PG&E transmission gas line rupture and explosion, directed staff to report back on the following items:

- Adequacy of repairs, inspection, prevention inspection and maintenance of gas transmission lines in Milpitas;
- Identify areas of potential improvements for the gas transmission lines;
- Evaluate and enhance emergency response plans for PG&E gas transmission infrastructure;
- Include information on other high pressure lines such as nitrogen and gasoline/jet fuel (JP5) fuel lines;
- Include information on San Bruno investigation findings;
- Provide periodic scheduled reports to the Council as information becomes available;
- Request for the Building Official to provide a public outreach on home gas line valve shut-off procedures.

The following report addresses these items and provides additional background information. At the time of this report, the National Transportation Safety Board (NTSB) has released two interim reports. These reports have ruled out several possible causes of the San Bruno pipeline rupture and explosion, however the exact cause has not yet been determined and the investigation is ongoing.

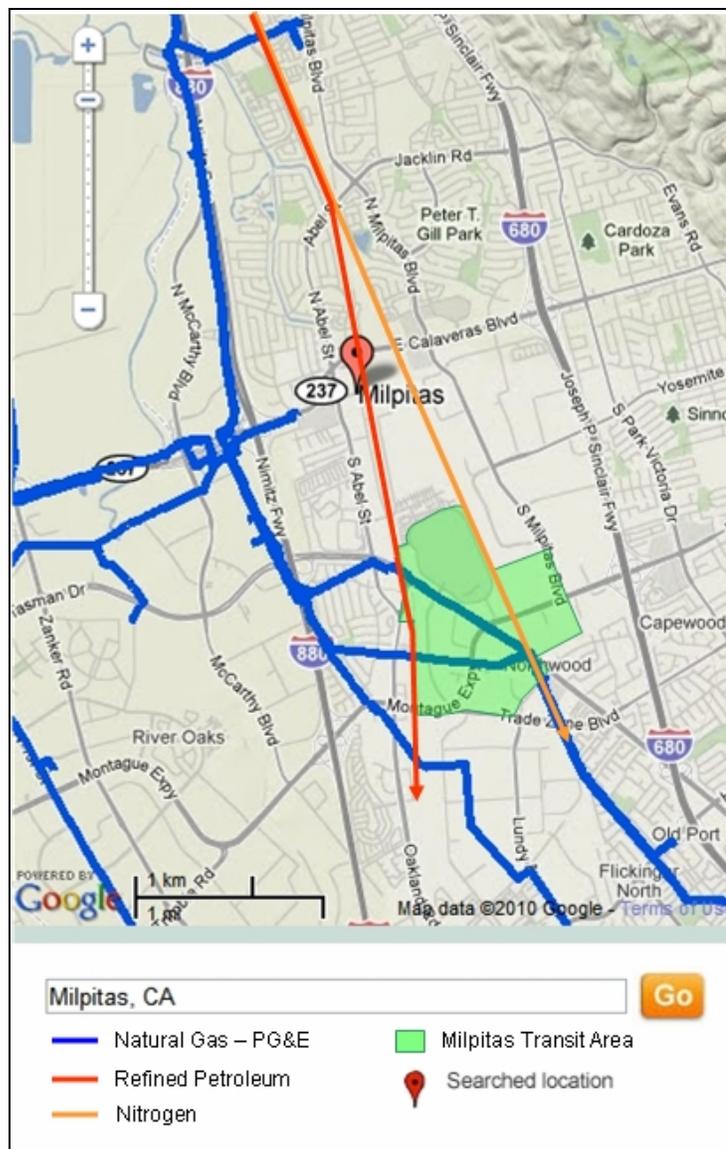


## 1) PG&E gas transmission line system within Milpitas

- a) The map below illustrates PG&E's gas transmission system within Milpitas indicated in blue as show on PG&E's web site:

[www.pge.com/myhome/edusafety/systemworks/gas/transmissionpipelines/](http://www.pge.com/myhome/edusafety/systemworks/gas/transmissionpipelines/)

Staff has overlaid the boundaries of the Transit Area Specific Plan and other high pressure transmission systems (refer to Section 5 of this report) that run through the City. As the map illustrates, all three transmission systems cross through existing and future neighborhoods planned within the City. While this information will be used to enhance emergency protocols and specific conditions of approval for future developments, staff is not recommending any General Plan land-use changes around these transmission systems at this time.





## 2) Current PG&E Investigation by National Transportation Safety Board

National Transportation Safety Board  
Washington, D.C. 20594

### Preliminary Report

- Accident No.: DCA10MP008
- Type of System: 30-inch natural gas transmission pipeline
- Accident Type: Pipeline rupture
- Location: San Bruno, CA
- Date: September 9, 2010
- Time: About 6:11 p.m., Pacific Daylight Time
- Owner/Operator: Pacific Gas & Electric Company
- Fatalities/Injuries: Eight fatalities, multiple injuries
- Pipeline Pressure: 386 pounds per square inch gauge (psig) at the time of rupture
- Quantity Released: Approximately 47.6 million standard cubic feet (MMSCF)

On September 9, 2010, at approximately 6:11 p.m. Pacific Daylight Time(1), a 30-inch diameter natural gas transmission pipeline (Line 132) owned and operated by Pacific Gas & Electric Company (PG&E) ruptured in a residential area in San Bruno, California. On September 10, the NTSB launched a team to California to investigate this tragedy. Vice Chairman Christopher Hart was the NTSB Board Member on scene in San Bruno.

The rupture on Line 132 occurred near mile post (MP) 39.33, at the intersection of Earl Avenue and Glenview Drive in the city of San Bruno. Approximately 47.6 million standard cubic feet (MMSCF) of natural gas was released as a result of the rupture. The rupture created a crater approximately 72 feet long by 26 feet wide. A pipe segment approximately 28 feet long was found about 100 feet away from the crater. The released natural gas was ignited sometime after the rupture; the resulting fire destroyed 37 homes and damaged 18. Eight people were killed, numerous individuals were injured, and many more were evacuated from the area.

The Incident Command was set up by the local fire department. The immediate response by local emergency responders, as well as three strategic drops of fire retardant and water by air, assisted in stopping the spread of the fire.

According to PG&E records, Line 132, which is regulated by the California Public Utilities Commission (CPUC), was constructed using 30-inch diameter steel pipe (API 5L Grade X42) with 0.375-inch thick wall. The pipeline was coated with hot applied asphalt, and was cathodically protected. The ruptured pipeline segment was installed circa 1956. The specified maximum operating pressure (MOP) for the ruptured pipeline

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was 375 pounds per square inch gauge (psig). According to PG&E, the maximum allowable operating pressure for the line was 400 psig.

Just before the accident, PG&E was working on their uninterruptable power supply (UPS) system at Milpitas Terminal, which is located about 39.33 miles southeast of the accident site. During the course of this work, the power supply from the UPS system to the supervisory control and data acquisition (SCADA) system malfunctioned so that instead of supplying a predetermined output of 24 volts of direct current (VDC), the UPS system supplied approximately 7 VDC or less to the SCADA system. Because of this anomaly, the electronic signal to the regulating valve for Line 132 was lost. The loss of the electrical signal resulted in the regulating valve moving from partially open to the full open position as designed. The pressure then increased to 386 psig. The over-protection valve, which was pneumatically activated and did not require electronic input, maintained the pressure at 386 psig.

At about 5:45 p.m., the SCADA system indicated that the pressure at Martin Station, which is downstream of the rupture location, exceeded 375 psig. The SCADA system indicated that the pressure at Martin Station continued to increase until it reached about 390 psig at about 6:00 p.m. At 6:08 p.m., it dropped to 386 psig. At 6:11 p.m., the pressure at Martin Station decreased from 386 to 361.4 psig; within one minute the pressure dropped to 289.9 psig.

PG&E dispatched a crew at 6:45 p.m. to isolate the ruptured pipe section by closing the nearest mainline valves. The upstream valve (MP 38.49) was closed at about 7:20 p.m. and the downstream valve at Healy Station (MP 40.05) was closed at about 7:40 p.m. Once the ruptured section was isolated and the gas flow was stopped, the resulting fire from the ruptured line self-extinguished. Later that evening, PG&E isolated the natural gas distribution system serving residences in the area, and within a minute of stopping the gas flow at about 11:30 p.m., fires from escaping natural gas at damaged houses went out.

When the NTSB arrived on scene on September 10, the investigation began with a visual examination of the pipe and the surrounding area. The investigators measured, photographed, and secured the approximately 28-foot-long ruptured pipe segment. On Monday, September 13, the ruptured pipe segment and two shorter segments of pipe, cut from the north and south sides of the rupture, were crated for transport to an NTSB facility in Ashburn, Va., for examination.

The examination revealed that the ruptured segment was 27 feet 8 inches long at its longest length, and consisted of a pipe section and four smaller pipe pieces (pups) between 3 feet 8.5 inches and 3 feet 11 inches long (pups are numbered one through four from south to north).

The segment north of the rupture (north segment) was 15 feet 9 inches long and consisted of a pipe section and two pups, 3 feet 7 inches and 4 feet 7 inches long (numbered five and six from south to north).



The section south of the rupture (south segment) was 12 feet 4.5 inches long at its longest length; it contained no pups.

All pipe pieces and pups showed fairly uniform wall thickness of 0.36 to 0.38 inches.

There were longitudinal fractures in the first and second pup of the ruptured segment and a partial circumferential fracture at the girth weld between the first and second pup. There was a complete circumferential fracture at the girth weld between the fourth pup in the ruptured segment and the fifth pup in the north segment. The longitudinal fracture in the first pup continued south into the pipe ending in a circumferential fracture in the middle of the pipe.

The following laboratory work on the pipe has been completed:

- Written documentation, photo documentation and visual inspection of the pipe.
- Removal of the asphalt coating from outside of the three pipe segments in preparation for non-destructive examination work.
- Radiography of the girth welds and select seams.
- Microbiological testing of the pipe surface (samples currently being analyzed).
- Ultrasonic wall thickness measurements.
- Magnetic particle inspection of welds and seams.
- 3-D laser scanning of the pipe pieces for a digital dimensional record of the evidence.
- Measurement of the longitudinal and circumferential pup dimensions.
- Removal of key fracture surfaces from the ruptured segment for further laboratory examination at the NTSB materials lab in Washington.

The following additional work is currently on-going:

- Precision cleaning of the fracture surfaces on the pieces cut from the ruptured pipe segment.
- Hardness and microhardness testing.
- Optical fractographic analysis and photodocumentation of the fracture surfaces on the pieces cut from the ruptured pipe segment.
- Preliminary scanning electron microscopy of the fracture surfaces on the pieces cut from the ruptured pipe segment

Additional factual updates will be provided and distributed via media advisory as investigative information is developed.

### **3) Emergency Response**

- a) Current state of readiness in Milpitas:



Milpitas Fire will continue a high level of vigilance regarding command and control of underground pipeline emergencies. The fire department has been in constant contact with PG&E officials and has updated all contact lists with distribution to the City of Milpitas Communication Center and Emergency Operations Center. The Milpitas Fire Department “Underground Pipeline Emergencies” and “Hazardous Materials Incidents” policies have recently (Nov. 2010) been updated to reflect the current level of situational awareness regarding PG&E infrastructure.

PG&E will provide their Emergency Contingency Plan to Milpitas Fire; these plans will be placed at the front gate and front office of the Milpitas Gas Distribution Terminal in secured devices. Terminal Plant personnel will provide “plume” modeling for potential release tracking. Plant personnel will also review potential threats and update all response protocols with full distribution to Milpitas Fire. These threats will include; domestic and international terrorism and vandalism, earthquake consideration and damage detection with major fault pipeline location identifiers. After incident/event surveillance and monitoring will also be provided to Milpitas Fire and City Emergency Operations Center.

PG&E pipeline valve maps have been provided to the Milpitas Fire Chief, due to Homeland Security implications, full distribution will be restricted to the Office of the Fire Chief and Fire Marshal as necessary. Additional PG&E mapping capabilities will be provided as necessary. Locations will include; Milpitas Emergency Operations Center, Milpitas Police and Fire Command Vehicles, with electronic versions loaded on all fire emergency response vehicles.

Communication Plan includes PG&E providing cell phone back-up and implementation of satellite phone system. PG&E will also update mobile and portable radio systems through the current FCC narrow banding communications infrastructure program. A “private” narrow banding system is in the works similar to Nextel. Milpitas Fire and PG&E will continue the communication development process that will provide the capability to communicate through common command and tactical channels. The Unified Command Structure under the National Incident Management System (NIMS) will be utilized for incident/event mitigation purposes.



Security Plan: PG&E is currently processing the installation of intruder detection devices on all perimeter fencing. There will also be upgrades and installation of a remote video surveillance system monitored from Fairfield, CA at Fairfield Security System. Gary Cooper is responsible for PG&E Corporate Security. PG&E will provide “knox box” key access to plant perimeter gate and buildings to Milpitas Fire Department. Security badges will be required for all certified and permitted PG&E personnel to enter command and secured locations. These security measures may include the TSA for future planning, development and implementation.

- b) PG&E training in Milpitas Emergency Operations Center and Fire Training in PG&E EOC:

Mandatory annual training components will be developed and implemented beginning January 2011. Mike Lange, PG&E Training Coordinator and Battalion Chief Scott Brown will coordinate and collaborate on all joint training modules. This phased approach to joint training will consist of:

Phase I: Plant Familiarization, to include all Milpitas Fire emergency response and fire prevention personnel. This training will be offered to all Hazmat Teams in Santa Clara County and will be scheduled annually.

Phase II: Table Top Exercises, to include mock emergency exercises that utilize NIMS and a structured Unified Command model. Mutual Aid resources, Law Enforcement, Public Works, Engineering and any other identified stakeholder will be invited to participate. An on-going training gap analysis will be conducted with after action reports generated to identify needed areas for improvement and emergency plan revisions.

Phase III: Hands-on-Drills, to include actual drill scenarios. These drills will implement all facets of incident command and include local resources, mutual aid responses, County Hazmat Teams, Technical specialist, Law Enforcement, Public Works, Engineering and other identified stakeholders.

- c) Review current Incident Response procedures for potential improvements, which consists generally as follows:

Assess the situation

- i) Approach with caution from upwind location
  - (1) Isolate and secure the area
  - (2) Employ ICS
  - (3) Identify hazards
  - (4) Identify and contact the pipeline operator using the emergency
  - (5) number listed on the pipeline marker



- ii) Protect people, property & the environment
  - (1) Establish isolation zones and set up barriers
  - (2) Rescue and evacuate people, if needed
  - (3) Eliminate ignition sources
  - (4) Stage apparatus and equipment based on atmospheric
  - (5) monitoring and weather conditions
  - (6) If liquid products are involved, use appropriate defensive
  - (7) Hazardous Waste Operations & Emergency Response



#### **4) PG&E Pipeline 2020 program**

- a) PG&E Pipeline 2020 program – PG&E has just announced the launching of an aggressive 5 component pipeline program, in response to the San Bruno incident.
  - i) Modernize Critical Pipeline Infrastructure – PG&E will be undertaking a pipeline modernization initiative for gas transmission pipeline segments located in heavily populated and other critical areas.
  - ii) Expand the Use of Automatic or Remotely Operated Shut-off valves – PG&E proposes to expand the use of remotely operated shut-off valves on segments of its gas transmission pipelines located in heavily populated areas. These remote controlled valves will allow PG&E to respond in shutting off valves much faster, without having to dispatch crews.
  - iii) Spur Development of Next-Generation Inspection Technologies - PG&E will establish an independent, nonprofit entity dedicated to researching and developing next-generation pipeline inspection and diagnostic tools. PG&E will work with other industry partners, leading institutions, and researchers to advance PG&E’s pipeline inspection capabilities.
  - iv) Develop Industry-Leading Best Practices – PG&E will closely review its practices related to pipeline integrity, safety and training against practices elsewhere in the industry, in order to develop industry-leading standards of excellence in this area.
  - v) Enhance Public Safety Partnerships – PG&E will expand on it’s work with the local communities, public officials and first responders to develop model partnerships in support of pipeline safety. PG&E will provide detailed, customized information on pipeline locations and emergency response plans, as well as enhanced annual emergency response training. PG&E will also increase it’s outreach and education to reduce the incidence of third-party dig-ins on PG&E pipelines.

#### **5) Other high pressure hazardous pipelines within Milpitas**

- a) Kinder Morgan has a San Francisco Product pipeline system consisting of approximately 864 miles of trunk pipeline in five segments that transport refined petroleum products from refineries in Richmond and Concord, to Brisbane, Sacramento, Chico, Fresno, Stockton and San Jose. The Kinder Morgan line goes through Milpitas along the Union Pacific Railroad (UPRR) right-of-way corridor. This line is a 10” diameter line which transports regular gasoline, diesel and jet fuel products.



- b) Air Products operates an 8” diameter nitrogen line that also goes through Milpitas from the east bay to San Jose. Fortunately, nitrogen is not a flammable material, non-the-less, it is still a hazardous material.

## **6) Additional suggestions for potential improvement**

City staff and PG&E are meeting regularly (on a monthly basis) and will continue to work together over the next year - to exchange information, coordinate safety and first response training, as well as to sharing information on PG&E infrastructure.

The following are some of the goals and objectives:

- a) more direct involvement with PG&E; including training with PG&E, Fire, PD and Public Works;
- b) Review all areas for expediting incident response times;
- c) Develop plan for fast emergency gas transmission valve shut-offs;
- d) Gain a better understanding of maintenance level of effort (current and potential enhancements);
- e) Gain a better understanding of maintenance repairs, records, including valve location and other key elements of infrastructure as it pertains to Milpitas first responder needs.

## **7) Community outreach and information**

- a) General information with no Homeland security implications; Milpitas office of emergency Services is partnering with PG&E on the development of translated materials. Also collaborating with San Jose OES on similar outcomes. Current interpretative capabilities include Hindi, Vietnamese and Spanish. Milpitas OES is researching utilization of Milpitas Community TV with “live” community outreach in the above mentioned dialects. Utilization of the Santa Clara County AlertSCC (reverse 911 systems) is also under consideration with enhancement and upgrades of message delivery which are a cost neutral option. Outreach is currently being conducted in partnership with the Milpitas emergency Preparedness Commission, the Indian Community Center and Christ Community Church as a force multiplier regarding disaster preparedness and crisis management community outreach.
- b) Sources and locations; all communication mediums (print, voice, live TV, etc...)