

**BEFORE THE PUBLIC UTILITIES COMMISSION  
OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking on the  
Commission's Own Motion to Adopt  
New Safety and Reliability Regulations  
for Natural Gas Transmission and  
Distribution Pipelines and Related  
Ratemaking Mechanisms.

Rulemaking 11-02-019  
(Filed February 24, 2011)

**CITY OF SAN BRUNO'S COMMENTS TO INDEPENDENT REVIEW  
PANEL REPORT**

STEVEN R. MEYERS  
BRITT K. STROTTMAN  
Meyers Nave  
555 12<sup>th</sup> Street, Suite 1500  
Oakland, CA 94607  
Phone: (510) 808-2000  
Fax: (510) 444-1108  
E-mail: [smeyers@meyersnave.com](mailto:smeyers@meyersnave.com)

Attorneys for  
CITY OF SAN BRUNO

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REPORT**

**I. INTRODUCTION**

On September 23, 2010, the California Public Utilities Commission ("Commission") adopted Resolution No. L-413, which formed a five member Independent Review Panel ("Panel"). The Commission charged the Panel with independently investigating the September 9, 2010 explosion of the 30-inch diameter high pressure underground natural gas transmission line (Line 132) owned and operated by Pacific Gas and Electric Company ("PG&E") and developing a set of recommendations to "best ensure such an accident is not repeated elsewhere." The Panel was directed to focus its fact-finding on the following questions<sup>1</sup>:

- What happened on September 9, 2010?
- What are the root causes of the incident?

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<sup>1</sup> [http://docs.cpuc.ca.gov/PUBLISHED/AGENDA\\_RESOLUTION/123786.htm](http://docs.cpuc.ca.gov/PUBLISHED/AGENDA_RESOLUTION/123786.htm)

- Was the accident indicative of broader management challenges and problems at PG&E in discharging its obligations in the area of public safety?
- Are the Commission's current permitting, inspection, ratemaking, and enforcement procedures as applied to natural gas transmission lines adequate?
- What corrective actions should the Commission take immediately?
- What additional corrective actions should the Commission take?
- What is the public's right to information concerning the location of natural gas transmission and distribution facilities in populated areas?

The Panel Report (“Panel Report”) was prepared with the assistance of its consultants: Jacobs Consultancy Inc., VanNess Fellman, Robert Nickell and Ralph Keeney. On June 8, 2011, the Panel Report was issued and made various findings and conclusions. In summary, the Panel Report found serious corporate and organizational problems, as well as gross construction and engineering failures of PG&E relative to the fabrication, installation, maintenance and integrity management of Line 132. The City agrees with these findings and conclusions.

The City appreciates the Panel’s efforts and dedication to determine the cause of the explosion and propose remediation measures to be undertaken by all the regulated utilities in California. The City, however, believes the Panel Report fails to address several potentially relevant causal and precipitating factors leading to the pipeline explosion as explained in more detail below. The City also believes the “root cause” analysis should be left to the National Transportation Safety Board (“NTSB”) as the NTSB has federal jurisdiction and has yet to issue its final accident report and is still

collecting data at this time. As we near the one year anniversary of the explosion and fire, the City remains concerned about critical safety issues that have been identified through the Commission's Order Instituting Rulemaking and Order Instituting Investigation and we believe that these safety issues need to be thoroughly addressed by the Commission.

It bears repeating that on behalf of our residents, the City has a vested and overarching interest in pipeline safety arising from the devastating pipeline explosion and fire that took place in our City. 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 today.

We believe that this fact-finding process and the failure analysis itself must remain fixed to the loss of eight lives and to the sixty-six victims who have been injured. Many of these victims continue to face long and difficult recoveries. Over ninety-eight homes suffered damage, some thirty-eight of these were completely obliterated, and a peaceful and quiet neighborhood was destroyed. Our residents' basic sense of safety and security in their own homes has been shattered.

## **II. DISCUSSION**

It is the City's position that this explosion was not an isolated incident and it was not just an "anomaly." While substandard and defective pipe manufacture, welding, fabrication and installation may be an unusual event in and of itself, the pervasive lack of corporate awareness of these engineering defects for almost sixty years, the absence of

meaningful investigation, examination and survey of this and other pipelines in High Consequence Areas and the adoption of integrity management methods known to be wholly incapable of detecting such engineering hazards is totally unacceptable for this utility, this industry, and this State. The Panel's report highlights systemic and deep-seated 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. A clear example of this culture and the corporate tendency to accept pseudo-scientific risk assessments and assumptions is found in PG&E's recently filed "MOTION FOR ADOPTION FOR MAXIMUM ALLOWABLE OPERATING PRESSURE ('MAOP') VALIDATION METHODOLOGY AND REQUEST FOR ORDER SHORTENING TIME TO RESPOND."

Essentially, PG&E asked this Commission to act "urgently" to issue an order which approves an assumption based approach and not fact-based methodology for validation of MAOP of PG&E's class 3 and 4 locations and class 1 and 2 high consequence area natural gas transmission pipelines ("HCA Pipeline"). This type of request, namely to accept assumptions of facts rather than actual facts, is part of the reason why we are here today and shows that PG&E continues to this day to foster fictions as a substitute for empirical analysis and engineering. PG&E assumed that the 1956 "grandfathered" Line 132 HCA Pipeline was manufactured, inspected, and installed properly according to the engineering standards of the day. Its records were also assumed to be accurate. Even almost a year after this devastating explosion, PG&E

continues to accept and promote the culture of assumptions that are not empirically based or scientifically proved.

**A. The Panel Report Fails to Address Several Relevant Causal Factors to the Pipeline Explosion.**

In addition to making substantive findings and conclusions regarding PG&E's corporate culture, the Panel included findings regarding the serious corporate and engineering failures of PG&E relative to the fabrication, construction, and maintenance and integrity management of Line 132 as the cause of the disaster. However, the City believes that some of the conclusions of the Panel are not based on fact, that they are diversionary, and that they fail to address several of the critical issues that the City believes are relevant causal factors to the pipeline explosion.

First of all, the Panel Report relies, without critical engineering peer examination, on a white paper report entitled "Preliminary Analysis of Publicly Available Evidence Supporting a Failure Cause of the PG&E San Bruno Incident" ("INGAA Report") submitted on behalf of the Interstate Natural Gas Association of America ("INGAA") to the NTSB on May 5, 2011. The Panel adopted without peer critique, independent engineering evaluation, or its own calculations or fact finding the conclusions of the INGAA Report. As explained below, the City takes exception to the third finding in the INGAA Report. Moreover, INGAA's objectivity is in question. INGAA is a trade association and PG&E is a member of INGAA.

The Panel Report fails to consider evidence in the public record of PG&E's reports and presentations to the City of San Bruno in 1992 and 1993 regarding geologic and

environmental issues and recommendations related to gas transmission lines in San Bruno.<sup>2</sup> These reports concluded that there were significant subsurface and seismic problems present in the existing transmission Line 132 right of way at the intersection of Earl and Glenview. Had the Panel contacted and interviewed knowledgeable City representatives, this critical information would have been readily available to the Panel.

The analyses in these reports 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 modifications to strengthen the pipeline. As we now tragically know, any examination of Line 132 at segment 180 would have revealed welding flaws.

Secondly, there is nothing in the Panel Report, nor in the INGAA Report, that connects the loss of control and pressure at Milpitas a few minutes before the explosion to the failure of Line 132 minutes later. There was a loss of pressure control at the Milpitas station minutes before the explosion that spiked the pressure in Line 132 such as to potentially precipitate the final catastrophic failure. It has been shown through the

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<sup>2</sup> SB Doc 67 1992, "Environmental Analysis Natural Gas Transmission Lines 109 and 132 Replacement Project in the Cities of Daly City, South San Francisco, San Bruno" prepared by Building and Land Services Permits and Environmental Planning Unit, PG&E November 1992.

SB Doc 68 1992, "Geologic Hazard Evaluations for Gas Transmission Lines 109 and 132 in San Bruno" prepared by the Geosciences Department, PG&E November 1, 1992

SB Doc 69 1993, "Presentation by PG&E at Planning Commission Meeting Replacement/relocation of high pressure gas lines April 19, 1993."

NTSB that there was a pressure increase at that specific portion of Line 132. Inadequate maintenance and control room coordination, protocols and/or procedures during maintenance activities at the control station upstream of the explosion site likely resulted in inadequate management of Line 132 and acted as a potentially 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.

Both the INGAA Report and Panel Report fail to address the importance of the internal pressure ranges and the history of these cyclic pressures and the possibility of cyclic pressure fatigue as a precipitating cause of ultimate failure of defective welds. Any information developed by the Panel could have definitively identified these pressure characteristics and would have helped the Commission understand the details of the loss of containment failure. An analysis of the information known at this time indicates that a combination of high cycle fatigue (low stress ranges and large number of cycles) and low cycle fatigue (a few high stress ranges and small number of cycles) pressure spiking and pressure surges from Milpitas on the afternoon of September 9<sup>th</sup> contributed to the failure of the pipeline. Indeed, historical data relating to operating pressure on Line 132 shows a range of 125 psi to 400 psi. This shows a significant range of pressure variation and this



information should have been reviewed by the Panel.<sup>3</sup> Both reports fail to conduct and develop cyclic fatigue analysis.

The Commission should have looked to develop a “history” of the cyclic pressures developed in the pipeline from the time it was put in operation until it lost containment once this history (number of cycles of given gas pressure ranges) was developed. A next step would have been to evaluate the steel fatigue characteristics, stress concentrations in the welds, and to determine the cumulative cyclic pressure range fatigue damage. The uncertainties in all of the parts of the fatigue damage analysis could be incorporated to develop an understanding of the effects of the different uncertainties on the cumulative fatigue damage determined from the analyses. Only fatigue damage analytical models which have been empirically validated with appropriate experimental and field performance data should be used in these analyses. Fatigue damage analytical models used in design should not be used because of implicit 'biases' which are used in most design models.

Third, it remains unknown as to whether the Panel and INGAA would have released its report with the current findings and conclusions if its authors knew about the 1988 leak on Line 132 some 9 miles south of the San Bruno rupture location and other now-known leaks. As discussed above, 2004 Federal integrity management regulations would have dictated the completion of a hydrostatic test of the pipeline. According to INGAA’s own finding, such a hydrostatic test would have detected the initial weld seam

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<sup>3</sup> See “Historical Data on Gas Main 132 in San Mateo and San Francisco Counties Installed in 1947, 1948.” GTR0115110.

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.

**B. It Remains Wholly Speculative To Conclude That the 2008 San Bruno Sewer Replacement Project Contributed to the Ultimate Failure of the 30-inch Diameter Natural Gas Pipeline.**

The City takes great exception to the third finding in the INGAA Report which is essentially adopted in the Panel Report:

“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.”

In addition to the technical analysis as outlined below, it is important to note that neither the Panel, nor INGAA, consulted with the City’s engineering staff nor the City’s contractor concerning the sewer replacement project. As well, the report did not address, nor apply, “best practices” associated with trenchless technology projects.

**1. External Forces Triggering the Manufacturing Defect in the Existing 30-inch Natural Gas Pipeline.**

The Panel theorized that an external force triggered the manufacturing defect in the existing 30-inch natural gas pipeline to propagate, thereby leading to the rupture. The Panel further points to a 2008 sewer replacement project (“sewer project”) undertaken by the City’s Contractor using trenchless pipe replacement (also known as “pipe bursting”) as turning a “stable” threat into an “unstable” threat, thus triggering the incident.

(See pg. 6, Panel Report). Surprisingly, the Panel did not interview the contractor (D'Arcy and Harty Construction) that conducted the trenchless pipe replacement, did not review the specifications for the project, nor did the Panel discuss details of the sewer project with the City's engineering staff. As, well, the drawing the Panel relied on in the INGAA report is incorrect because the drawing did not show the separation of the exposure pit (which exposed the gas transmission line) from the extraction pit, the drawing depicted them as combined.<sup>4</sup> The drawing also erroneously lengthened the extraction pit to include the exposure of the transmission line itself.<sup>5</sup> The separation between the pit locations is readily verifiable simply by looking at the October 1, 2009 Google Earth image.

There seem to be numerous omissions and erroneous conclusions in the Panel Report. Specifically, the Panel Report notes that residents of the City claimed to have heard their windows vibrating during the time that the trenchless pipe replacement operations were undertaken.<sup>6</sup> However, the Panel did not explore this line of inquiry with any scientific certainty. The City's contractor that supervised the project, John Harty from D'Arcy and Harty Construction, testified to NTSB that the crews, recognizing the presence of the high pressure natural gas pipeline, followed standard operational practices by turning off the air compressor to the hammer (i.e., conically-shaped bursting head) prior to crossing under the 30-inch pipeline, thereby eliminating any potential vibration

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<sup>4</sup> See pg. 21, INGAA Report.

<sup>5</sup> See pg. 21, INGAA Report.

<sup>6</sup> See pg. 67, Panel Report.

effects.<sup>7</sup> This standard operational practice was further substantiated in the INGAA Report, which stated that “it is unlikely that the pneumatic hammering of the head directly did any damage, especially since the hammer was turned off and only the winch was used to pull the new PE sewer the last 10 feet under the gas main.”<sup>8</sup> These important facts were not mentioned or considered in the Panel Report. Accordingly, there is no merit in the suggestion by the Panel that vibration effects from the pneumatic trenchless pipe replacement operation contributed either directly or indirectly in any way to the rupture of the 30-inch natural gas pipeline.

Indeed, Panel member Dr. Robert Nickell has, since the release of the Panel Report, retracted his initial conclusions that the trenchless pipe replacement project was the probable cause of the pipeline disaster.<sup>9</sup> This change was based on newly discovered information about the natural gas line’s operating pressure history. There are no facts linking the 2008 sewer project to the rupture of the 30-inch PG&E natural gas pipeline in 2010.

## **2. Trenchless Pipe Replacement Practices Conducted by D’Arcy and Harty**

The Panel Report failed to highlight that in any trenchless pipe replacement project, planning of the operation involves the majority of time compared to the actual bursting operation itself. The Panel Report did not examine whether D’Arcy and Harty

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<sup>7</sup> See pp. 45, 46, 50 of January 3, 2011 NTSB Interview of John Harty.

<sup>8</sup> See pg. 20, INGAA Report.

<sup>9</sup> <http://www.sfgate.com/cgi-bin/article.cgi?file=/c/a/2011/06/29/MNER1K3KND.DTL>

followed industry-accepted best practices during the trenchless pipe replacement operation conducted during the Rollingwood Sewer Basin Improvements – Phase 2.

Based on the testimony in the NTSB docket and the additional evidence available to the Panel, it appears that D’Arcy and Harty followed the industry-accepted best practices during the replacement of the 6-inch VCP pipe with the 10-inch HDPE pipe as part of the project. For example, according to testimony by John Harty, USA One Call was contacted prior to commencement of the project as required by Underground Facility Law.

D’Arcy and Harty took all precautions to ensure that the natural gas pipeline would not be compromised during the trenchless pipe replacement operation. For example, once identified, the 30-inch natural gas pipeline was physically exposed at the location of the sewer pipe crossing by digging on both sides and underneath. (*See* pg. 29, January 3, 2011 NTSB Interview of John Harty). This excavation was kept open the entire time that D’Arcy and Harty performed the trenchless pipe replacement operation to ensure that no damage was done to the existing gas pipeline.<sup>10</sup>

Moreover, the Panel did not evaluate whether the insertion pit and extraction pits were well planned and within acceptable best practices. The insertion pit was approximately 2 ft wide by 24 ft long<sup>11</sup>, while the receiving pit was approximately 8 ft wide by 8 ft long at the manhole.<sup>12</sup> These dimensions appear to be well planned out

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<sup>10</sup> *See* pg. 30, January 3, 2011 NTSB Interview of John Harty.

<sup>11</sup> *See* pg. 20, NTSB Interview of John Harty.

<sup>12</sup> *See* pg. 41, NTSB Interview of John Harty.

based on the selected trenchless pipe replacement technology and dimensions of the new HDPE pipe. The Panel did not analyze whether the selection of the Hercules pneumatic trenchless pipe replacement hammer with an 11-inch O.D. bursting head and 10 ton winch was appropriate for the upsize and length of the project.

The Panel did not consider the fact that Harty testified that there were no impediments to advancement of the trenchless pipe replacement operation nor any visual surface heave or cracks in the asphalt.<sup>13</sup> As previously mentioned above, the air to the hammer was turned off to ensure that no vibrations would affect the gas pipeline when bursting underneath the main. The Panel did not examine this practice, but this practice evidences the fact that D'Arcy and Harty were fully aware of the potential risks involved in performing a trenchless pipe replacement operation beneath a high pressure gas main and took every precaution to ensure that their operation would not compromise the existing gas main.

The Panel did not adequately identify the fact that the City's contractor properly notified PG&E regarding the 2008 sewer replacement work. Finally, the Panel Report fails to identify that the City's contractor, D'Arcy and Harty, is a nationally recognized leader in the industry with broad experience in trenchless pipe replacement technology.

The Panel's conclusions regarding the 2008 sewer project are speculative and are not based on any engineering certainty. There is no physical proof, nor circumstantial proof, linking the trenchless pipe replacement operations to the pipeline incident.

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<sup>13</sup> See pg. 21, January 3, 2011 NTSB Interview of John Harty.

### III. CONCLUSION

It is speculative and unsubstantiated by any engineering certainty to conclude that a trenchless pipe replacement operation completed in June 2008 could have led to the ultimate failure of the 30-inch diameter natural gas pipeline (or any other underground utility) *over two years later* in September 2010. It remains uncontroverted at this time that PG&E's lack of proper integrity management over its failed, substandard, high-risk pipeline was one, if not the main, precipitating cause of the explosion.

Respectfully submitted,

/s/ Steven R. Meyers

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Steven R. Meyers  
Britt K. Strottman  
Meyers Nave  
555 12<sup>th</sup> Street, Suite 1500  
Oakland, CA 94607  
Phone: (510) 808-2000  
E-mail: smeyers@meyersnave.com

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