

January 9, 2014

Jeff Maltbie, City Manager  
City of San Carlos  
City Hall  
600 Elm Street  
San Carlos, CA 94070

Dear Mr. Maltbie:

As you are aware, Pacific Gas and Electric Company (PG&E) brought Line 147 back into service on December 20 after the safety division of the California Public Utilities Commission affirmed that the line is safe to operate.

Even with this assurance, we recognize that you continue to have concerns about this pipeline. Our ongoing commitment to the City of San Carlos is to address those concerns and to work with you to address your concerns to the greatest extent possible.

We want to assure you that we continue to extensively test and monitor our gas system with a goal of creating the safest and most reliable gas system in the nation.

As a convenience, we have provided the attached compilation of safety information about Line 147 so that you have ready access to it.

We hope the information provided in this report is helpful. As always, we are available to address any questions you may have now and in the future.

Sincerely,



Sumeet Singh  
Senior Director, Gas Operations  
Integrity Management

Papia Gambelin

Papia Gambelin  
Director, Corporate Affairs  
Central Coast Region

CC:  
Mark Olbert, Mayor  
Ron Collins, Vice Mayor  
Matt Grocott, Councilmember  
Cameron Johnson, Councilmember  
Bob Grassilli, Councilmember

## I. LINE 147 IS SAFE TO OPERATE AT ITS INTENDED PRESSURE

Extensive external and internal engineering and safety analyses of Line 147<sup>1</sup> have established that the pipeline is safe to operate at 330 pounds per square inch gauge (“psig”), which is the current maximum allowable operating pressure (“MAOP”).<sup>2</sup> Line 147 underwent a successful hydrostatic pressure test at nearly twice its intended operating pressure, which established the integrity of the line. As one of the nation’s leading natural gas pipeline safety experts, Michael Rosenfeld of Kiefner & Associates, stated: “The October 2011 hydrostatic pressure spike test confirmed the fitness for service of the pipeline at its intended MAOP **without doubt.**” See Attachment A, p. 1. (10/18/13 Kiefner Letter) (emphasis added).<sup>3</sup> Additionally, the Safety and Enforcement Division (“SED”) of the California Public Utilities Commission (“CPUC” or “Commission”), accountable for providing safety oversight of California’s natural gas infrastructure, conducted its own independent and thorough review of the safety of Line 147 and concluded that:

PG&E successfully strength tested, using hydro-testing conforming to [federal] requirements, and with a minimum spike pressure of 5% and no more than 10% above the minimum test pressure held for no more than 30 minutes, Line 147 to establish its integrity to operate at pressures in excess of 330 psig. See Attachment B, p. 21 (11/14/13 SED Report).

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<sup>1</sup> Line 147 is a natural gas transmission pipeline serving the San Francisco Peninsula. Line 147 runs for approximately 3.8-miles in an east-west direction and serves to connect Line 101, a natural gas transmission line that runs from Santa Clara County to City of San Francisco, to Lines 109 and 132, the other two natural gas transmission lines that serve the Peninsula and San Francisco. In all, approximately 650,000 customers along the Peninsula are supplied natural gas by Lines 109, 132 and 101.

<sup>2</sup> Maximum Allowable Operating Pressure is defined by 49 CFR, Part 192.3, as “the maximum pressure at which a pipeline or segment of a pipeline may be operated under this part.”

<sup>3</sup> [Redacted] has nearly 30 years of experience in the pipeline industry, and is widely considered one of the preeminent experts in the field. Since joining Kiefner & Associates, Inc. in 1991, [Redacted] has participated in nearly every aspect of pipeline safety-related analyses on behalf of oil and gas pipeline operators, including numerous pipeline failure investigations, risk assessments, pipeline stress analyses, fitness-for-service assessments, evaluation of the time-to-failure for conditions such as fatigue, stress corrosion and cracking, corrosion. [Redacted] has also conducted technical studies on behalf of the federal Pipeline and Hazardous Materials Safety Administration (“PHMSA”), presented numerous seminars and trainings related to pipeline safety and authored various influential articles on the subject.

Hydrostatic pressure testing is widely considered the leading industry standard to safeguard against manufacturing defects and help ensure the integrity and safe operation of a gas transmission pipeline. A hydrostatic pressure test subjects a pipeline to pressures well in excess of its normal operating pressure to test its strength and to identify any leaks. Hydrostatic testing of pipes and pipelines is generally performed to expose defects that may exist and fail or leak at the test pressure limits and ensure that any remaining defects are insignificant enough to allow normal operation with a very large margin of safety, and validate the overall integrity of the pipe. The Line 147 test pressures were nearly double its intended operating pressure.<sup>4</sup>

Industry experts support the role of hydrostatic testing in assessing the integrity of natural gas pipelines. See e.g., Attachment C (*The Benefits and Limitations of Hydrostatic Testing*, by John F. Kiefner and Willard A. Maxey). Pipeline industry standards and state and federal pipeline regulations have recognized hydrostatic testing as a means of demonstrating the fitness for service, and have in fact mandated hydrostatic testing in various circumstances, including:

- In the 1955 edition of its standard B31.1.8, an industry technical best practice guideline specific to natural gas pipelines, the American Society of Mechanical Engineers (“ASME”) endorsed hydrostatic testing of newly-installed pipes.
- The CPUC’s General Order (GO) 112, first issued in 1961 required California utilities to pressure test new natural gas pipelines. Subsequent versions of GO 112 have affirmed the role of hydrostatic testing in ensuring the integrity of gas pipelines.

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<sup>4</sup> PG&E has conducted its hydrostatic testing program, including the hydro test of Line 147, in consultation with the CPUC and in partnership with experts in the industry. PG&E’s hydrostatic testing program is part of the company’s overall Pipeline Safety Enhancement Plan, a multi-year pipeline testing and replacement program that was developed after consulting with the CPUC and a broad number of key industry and community stakeholders and subsequently approved by the CPUC. Since 2011, this program has pressure tested over 450 miles of gas transmission pipeline, including Line 147.

- In 1971 hydrostatic testing was incorporated as a minimum federal safety standard for new pipelines.
- The California State Fire Marshall, which regulates certain intrastate and interstate hazardous liquid pipelines within California, has since the mid-1980s overseen a program requiring periodic hydrostatic testing of the pipelines within its jurisdiction. In a 2011 presentation at the CPUC, the Fire Marshall indicated that more than 3,000 hydrostatic tests have been performed under this program.

[Redacted] and Dr. Glen Stevick, the expert retained by the City of San Carlos, both described the hydrotest as a “proof test” that proves the pipe is safe to operate. As [Redact] [Redacted] testified, this proof test is valid regardless of what the pipe specifications are:

[C]onceptually it’s like saying if the bridge can hold an 80-ton truck, it’s logical that it can hold up a 40-ton truck, and it doesn’t matter what the bridge is made out of. Whether it’s wood, stone, wrought iron or, you know, high test steel, it can do that job. . . . [A] successful test can make up for or can help compensate for some things that aren’t known such as every – the complete description of every piece of pipe. And that relies on the fact that the hydrotest was performed to a pretty high level over and above what the pipeline operates [at].  
See Attachment D, pp. 2959-60 (11/20/13 CPUC Transcript).

Line 147 underwent a proof test to nearly double its intended operating pressure, which establishes its fitness for service.<sup>5</sup>

## II. CONCERNS RAISED BY PG&E’s CONTRACTOR WERE FULLY ADDRESSED

On November 17, 2012, following the discovery of a leak on Line 147, a PG&E contractor (and former PG&E engineer) wrote an internal email in which he asked several questions about Line 147. PG&E understands that this email, without the appropriate context and explanation, created confusion and concern that San Carlos residents might be at risk from potential defects in Line 147. However, PG&E’s contractor did not believe that Line 147 was unsafe or in danger

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<sup>5</sup> SED’s report also stated: “The hydro-tests performed on Line 147 in 2011...assessed for the effects of exposure to decades of time dependent threats such as cracking due to fatigue or stress corrosion cracking (SCC) and internal or external corrosion, as well as non-time dependent threats, such as third-party damage, and confirmed the ongoing integrity of Line 147.” See Attachment B, p. 19 (11/14/13 SED Report)

of rupturing, but was instead trying to make sure that PG&E engineers properly evaluated all issues that might arise from the discovery of pipe in the ground that was different from what PG&E thought it was. As PG&E's contractor stated, "I wanted to make sure that we did as much as possible. It wasn't that I thought there was an immediate rupture threat or safety threat, right there on the pipeline. It was that I wanted to make sure we were very clear and gathered all the information we needed to show there wasn't a threat to it." When asked whether he believed that there was an existing safety hazard on Line 147 in November 2012, the contractor replied, simply, "No." See Attachment B, pp. 12-17 (11/14/13 SED Report), and Attachment D, pp. 2903-2951 (11/20/13 CPUC Transcript).

The contractor achieved his objective of getting PG&E to focus on all potential issues. His concerns were addressed quickly and completely by PG&E engineers. As stated by the contractor, "within a week I felt [my concerns] had been addressed. And that everybody had evaluated it and looked at it and made a reasonable decision." The contractor's confidence in the safety of Line 147 was recently expressed by his signature on PG&E's October 2013 Line 147 MAOP Validation reports included in the safety certification filing.

PG&E recognizes that, without additional context and complete information regarding the successful hydrostatic testing of the pipeline, the November 2012 email caused alarm and confusion regarding the safety of Line 147. PG&E sincerely regrets the concerns this email has caused. The company is committed to open, transparent, and complete communications with the City of San Carlos regarding the future operation of its gas system, including Line 147.

### **III. PG&E's INTEGRATED GAS PIPELINE SYSTEM AND THE IMPORTANCE OF LINE 147**

PG&E's natural gas transmission system on the San Francisco Peninsula was designed and constructed as an interdependent system. This was done in part to provide service reliability in the event that one of the Peninsula lines described above is taken out of service. Service interruptions on a given line can happen for any number of reasons, including unplanned events such as third-party damage or equipment malfunctions and planned events such as scheduled maintenance or upgrades as part of pipeline safety enhancements. Line 147

is a critical transmission pipeline, as it ensures both service reliability and adequate supply of natural gas to the Peninsula system by balancing demand between the parallel transmission lines to which it connects. In order to function as an integrated system, all pipelines along the Peninsula must operate at a sufficiently high pressure to allow PG&E to balance demand among the pipelines. If, for example, a segment of Line 101 were taken out of service unexpectedly while Line 147 is operating at a lower pressure, PG&E's core customers could lose gas service across numerous Bay Area communities. Core customers are residential and small commercial customers who have no alternative to PG&E's natural gas service for such necessities as heating, hot water and cooking. In addition, PG&E's non-core, non-residential customers –such as power generation facilities, schools and hospitals– who voluntarily sign an agreement with PG&E where they receive a lower rate in exchange for being available to reduce usage when we call on them would suffer even greater impact, as they would be the first customers to be curtailed.

Moreover, weather conditions are a significant factor in driving demand for natural gas service, with colder temperatures generally leading to higher demand. Under extreme cold weather scenarios, operation of Line 147 at a lower pressure could lead to the loss of natural gas service to many customers throughout the Peninsula and San Francisco. And, finally, operation of Line 147 below its intended pressure would result in continued delays of planned safety-related projects such as pressure testing, valve automation and pipe replacement on PG&E's Peninsula pipeline system.

#### **IV. THE ROLE OF THE CPUC & SED**

Given the integrated nature of PG&E's system, the safety of the natural gas pipelines that traverse the service territories of PG&E and the other gas utilities in California is a matter of statewide concern. That is why the State Constitution and the Legislature have entrusted the regulation of the safety of those facilities to the exclusive jurisdiction of a single agency – the

CPUC. The CPUC oversees the safety of the state’s natural gas utilities,<sup>6</sup> as well as other industries.<sup>7</sup>

As part of carrying out its safety mandate over intrastate pipelines, the CPUC promulgated and enforces GO 112-E, the “State of California Rules Governing Design, Construction, Testing, Operation, and Maintenance of Gas Gathering, Transmission, and Distribution Piping Systems.” The CPUC rules incorporate and supplement the federal pipeline safety regulations adopted by Pipeline and Hazardous Materials Safety Administration (PHMSA) in 49 C.F.R. Parts 190, 191, 192, 193 and 199.

As part of the CPUC’s ongoing regulation, SED’s safety staff (which includes pipeline engineers) regularly audits and oversees the operations of PG&E and the other gas utilities and ensures that California’s natural gas systems are designed, constructed, operated, and maintained according to safety standards set by the CPUC and PHMSA. SED’s gas safety inspectors are trained and certified by the PHMSA. The CPUC enforces safety regulations, inspects utility work, and makes necessary additions and changes to regulations for promoting the safety of the public and the utility employees that work on the gas pipeline systems. The CPUC conducts compliance inspections, accident investigations, reviews utilities’ reports and records, conducts construction inspections, conducts special studies, and takes action in response to complaints and inquiries from the public on issues regarding gas pipeline safety. The SED reports to the Executive Director of the CPUC, who in turn reports to the appointed Commissioners.

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<sup>6</sup> Intrastate pipelines are also within the jurisdiction of PHMSA, an agency within the U.S. Department of Transportation. PHMSA prescribes and enforces minimum safety standards relating to the design, installation, construction, testing, inspection, integrity management, operations, replacement, and maintenance of pipelines. Through a state-federal partnership, the CPUC regulates intrastate gas pipeline facilities such as Line 147.

<sup>7</sup> The CPUC also oversees electric utilities, communications providers, electric generation facilities, freight railroads, inter-city and commuter railroads, rail transit systems, rail crossings, household goods carriers, and passenger carriers.

## **V. CPUC HEARINGS REGARDING LINE 147**

The CPUC held evidentiary hearings on the safety of Line 147 on November 18, 2013 and November 20, 2013. The City of San Carlos was granted party status in the proceeding, which afforded the City the opportunity to serve discovery, cross-examine PG&E's witnesses, submit legal briefs, present evidence, and attend prehearing conferences, informational workshops and meet-and-confer sessions. Counsel for San Carlos and other parties cross-examined PG&E's witnesses, and the Administrative Law Judge ("ALJ") and assigned Commissioner asked questions as well. City of San Carlos also presented its own expert testimony from Dr. Glen Stevick for consideration by the ALJ. Dr. Stevick initially indicated that "Line 147 can almost certainly be operated safely with proper assessment and tracking of pressure cycles and reevaluations when required." Attachment E (11/14/13 Stevick testimony).

On December 19, 2013, the CPUC unanimously adopted a decision that the pressure of Line 147 "can safely be restored" to 330 psig. See CPUC Decision (D.13-12-042) available at: <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M083/K887/83887558.PDF>

## **VI. FEDERAL REGULATIONS & CPUC DIRECTIVES REGARDING MAOP**

PG&E's Maximum Allowable Operation Pressure (MAOP) validation process, as approved by the Commission, calculates MAOP for the company's pipelines in a manner that is more conservative than the federal regulations and the CPUC's directives. Under the CPUC's June 2011 order, all pre-1970 pipelines without records of past pressure tests must be pressure tested to validate their MAOP, or be replaced altogether.

Accordingly, PG&E successfully pressure tested all of Line 147 to pressures in excess of 600 pounds, which validated the line's historical operating pressure of 400 psig.<sup>8</sup> However, rather

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<sup>8</sup> In its recent decision regarding Line 147, the CPUC confirmed that it has not applied subsection 619(a) to pipelines pressure tested pursuant to its June 2011 decision: "That subsection [192.619(a)] is applicable to pipelines installed beyond the effective date of these [federal] regulations since all pipelines are expected to be designed per these regulations. The Commission adopted a specific pipeline features analysis methodology for PG&E to use in its Pipeline Safety Enhancement Program with the older in-service pipeline." See D.13-12-042, p.14.



than requesting to restore the MAOP of Line 147 to 400 psig as allowed under the CPUC's June 2011 order, PG&E has chosen to keep the MAOP at the more conservative 330 psig, which is the calculated MAOP of the weakest pipeline component using conservative assumptions, otherwise known as the interim component calculation.

Under federal pipeline safety regulation 49 C.F.R. § 192.619(a), pipelines designed and installed following implementation of the federal regulations in the early 1970s must have an MAOP that is the lowest of several values including (1) the design pressure of the weakest element in the segment, (2) the pressure obtained by dividing the post-construction pressure test by a factor tied to the segment's class location, and (3) the highest actual operating pressure to which the segment was subjected between July 1, 1965 and June 30, 1970. However, pipelines that were designed and installed prior to the federal regulations are not subject to this limitation. As stated in 49 C.F.R. section 192.619(c):

The requirements on pressure restrictions in this section do not apply in the following instance. An operator may operate a segment of pipeline found to be in satisfactory condition, considering its operating and maintenance history, at the highest actual operating pressure to which the segment was subjected during the 5 years preceding [July 1, 1970].

Thus, a pipeline that was designed and constructed prior to implementation of the federal regulations may operate at the highest pressure experienced in the five years prior to July 1, 1970 even if that pressure exceeds the design pressure calculated under 49 C.F.R. section 192.105. As explained by Jeffrey D. Wiese, PHMSA Associate Administrator for Pipeline Safety:

When these rules were first promulgated in 1970, PHMSA recognized that an operator may not have all the pressure data needed for existing pipelines. Therefore, we included in the rules a "grandfather clause" to allow pipeline operators to establish the MAOP of an existing pipeline segment in satisfactory condition, and considering its operating and maintenance history, at the highest actual operating pressure to which the segment was subjected during the 5 years prior to July 1, 1970. This "grandfather clause" is codified in § 192.619(c)[.] See Attachment F (March 17, 2008 letter from Jeffrey D. Wiese to Dennis Fothergill).

PHMSA confirmed Mr. Wiese's correspondence in formal instruction to operators in establishing MAOP. As stated in these instructions:

For transmission pipelines, under certain circumstances a design pressure limit (or lack of information on which to set a design pressure limit) may be overridden by Part 192.619(c). This regulation allows systems components installed prior to July 1, 1970, to remain in service at the same pressure they were subjected to between July 1, 1965, and June 30, 1970, even if that pressure exceeds the pressure rating for the component. If that is the case, the historic operating pressure may be used to set the MAOP in lieu of the design pressure. See Attachment G (Determination of Maximum Allowable Operating Pressure in Natural Gas Pipelines).

In June 2011, the CPUC issued an order requiring all "grandfathered" natural gas transmission pipelines in California to have their MAOPs verified by a pressure test. The first sentence of the order states: "[t]his decision orders all California natural gas transmission operators to develop and file for Commission consideration A Natural Gas Transmission Pipeline Comprehensive Pressure Testing Implementation Plan (Implementation Plans) to achieve the goal of orderly and cost effectively replacing or testing all natural gas transmission pipeline that have not been pressure tested." See CPUC Decision (D.11-06-017) available at: [http://docs.cpuc.ca.gov/PublishedDocs/WORD\\_PDF/FINAL\\_DECISION/137309.PDF](http://docs.cpuc.ca.gov/PublishedDocs/WORD_PDF/FINAL_DECISION/137309.PDF)

As an interim measure, the CPUC further ordered PG&E to complete its MAOP determination based on component calculations using engineering-based assumptions for pipeline components where complete pressure test records were not available. In that regard, the CPUC's decision stated that "MAOP determined by component calculation is useful for prioritizing segments for interim pressure reductions and replacement or pressure testing, but MAOP determined in this manner is not reliable enough for permanent pipeline operations" and therefore ordered all pipelines without a record of a pressure test to be tested or replaced.

In the case of Line 147, which was originally constructed prior to 1970, § 192.619(a) would not apply. Moreover, PG&E does not possess the records required to establish the design pressure under § 192.619(a)(1). Thus, under the federal regulations, PG&E followed

§ 192.619(c), which permitted PG&E to operate the pipeline at the historic operating pressure of 400 psig. However, PG&E must now also follow the Commission's directive that prohibits reliance on the "grandfather clause" in establishing MAOP by requiring a pressure test. PG&E goes a step further to also apply the interim component calculation, even if the line is subjected to a subsequent pressure test to further limit the MAOP.

## **VII. ONGOING SAFETY MEASURES**

PG&E has conducted and continues to perform maintenance and integrity management activities to ensure the continued safe operation of Line 147. For example:

- PG&E has continued to perform leak surveys of Line 147 on an annual basis. This process consists of qualified leak surveyors walking the pipeline with sensitive equipment to detect the presence of any gas leaks. All of Line 147 was surveyed in April 2013 and no leaks were identified. PG&E will continue to leak survey the entire pipeline on an annual frequency.
- PG&E also conducts patrols of its gas transmission pipelines in addition to the leak surveys to look for missing pipeline markers, identifying construction activity in close proximity to the pipeline and other factors that may impact the pipeline. PG&E has been patrolling Line 147 on a monthly basis. All of Line 147 was patrolled in January 2014 and no issues were identified. PG&E will continue to patrol the line on a monthly frequency.
- PG&E has installed cathodic protection on Line 147 as steel pipe has a natural tendency to corrode. Cathodic protection helps to guard against corrosion of the metal pipe surface by connecting it to a more easily corroded "sacrificial metal" known as an anode so that the anode then corrodes instead of the protected metal pipe. To make sure that the cathodic protection is effective, PG&E inspects its cathodic protection systems on Line 147 once every two months. The most recent inspections were performed in November 2013 and no issues were identified. PG&E will continue to perform these inspections on a bi-monthly basis.
- Since the CPUC authorized PG&E to restore Line 147's pressure on December 19, 2013, PG&E was able to put into operations two new automated valves on Line 147, which

provide capabilities to shut-off the valves without dispatching crews, thus dramatically shortening response time.

#### **VIII. INTEGRITY ASSESSMENT PLANNING FOR LINE 147**

In addition to the ongoing safety measures described above, performing an In Line Inspection (ILI) on Line 147 has been part of our integrity assessment plans. We have prioritized our plans to accelerate conducting an ILI on Line 147 in 2014. Prior to the inspection, there are two major activities that need to be completed: (1) replace a section of pipe so that the ILI tool can successfully traverse the entire length of the pipeline and (2) identify an ILI tool to conduct a successful inspection based on a MAOP of 330 psig.

With regard to the first issue, Line 147 spans approximately four miles and is a multi-diameter pipeline. A section of Line 147 contains a bend and associated piping that is located in close proximity to a creek crossing that will require replacement. We are currently working on the design and construction needs for the area near the creek, which is an environmentally sensitive area. Once we fully assess the potential impacts, we will apply to the California Department of Fish and Wildlife, U.S. Army Corps of Engineers, and the Regional Water Quality Control Board for any necessary permits. PG&E welcomes the support of the City of San Carlos, Congresswoman Jackie Speier and other stakeholders to obtain these permits in a timely manner.

The second activity is related to identifying an ILI tool associated with the operating pressure of the line. Based on the assessment performed regarding ILI tool feasibility, we have identified a tool that requires a minimum operating pressure of 365 psig, which is needed to accommodate the velocity requirements of the ILI tool to successfully traverse the pipeline. We will continue our due diligence to identify an ILI tool that can successfully conduct an inspection based on an MAOP of 330 psig or seek regulatory approvals from the CPUC to further increase the pressure in the pipeline to facilitate the ILI, as required.