Pacific Gas and Electric Company®

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December 20, 2013

Elizaveta Malashenko
Deputy Director
Office of Utility Safety and Reliability
Safety and Enforcement Division
California Public Utilities Commission

Re: Update - Oakland Incident of December 10, 2013

Dear Ms. Malashenko,

I wanted to provide you another update of the actions taken thus far and the current results of our analysis for the incident that occurred on December 10, 2013 near Redacted and Redacted in Oakland. This incident involved a gas leak and subsequent fire emanating from a 4 inch steel seamless elbow being operated at distribution pressure at a depth of approximately six feet. We enlisted the help of Exponent Engineering to perform the root cause analysis and to determine the source of ignition. The following are our findings to date and next steps.

METALLURGICAL ANALYSIS – External forces acting on the pipeline resulted in stresses that caused the fracture. No evidence of progressive fracture (such as fatigue or stress corrosion cracking) was observed and the elbow fractured in a brittle manner. The fracture was not associated with a mechanical, corrosion, or material properties (metallurgical) related defect. Tensile tests were performed on samples of the elbow and the results showed that both the yield and tensile strength properties were in accordance with ASTM A106 requirements.

FINITE ELEMENT MODELING - Exponent has completed the finite element analysis of the pipe in the immediate vicinity of the fractured elbow. The model considers potential interaction between other underground utilities in the immediate vicinity (water line and sewer line). The results of this work have concluded that the potential interactions with water and sewer facilities did not likely contribute to this failure.

Exponent also considered the forces that could have resulted from movement (creep) associated with the Hayward Fault. There are many uncertainties

associated with this modeling however; these forces acting on the piping configuration do indicate the potential for enough force to have caused the break at the elbow. Additionally, available information from the USGS on the rate of creep of the Hayward fault in this area supports a fair amount of displacement of the fault at this location over time.

LEAK SURVEY RESULTS - On December 17 and 18 PG&E conducted a special leak survey in the area of Redacted and Redacted focusing on gas distribution pipelines located in the vicinity of the Hayward fault. The leak survey identified one grade 1 leak and seven grade 2 and 2+ leaks which are shown on the attached map. The grade 1 leak, located on a service Tee at the main and unrelated to the external forces noted above, was repaired. The seven grade 2+ and grade 2 leaks will be repaired by 12/31/13. We are continuing the process of repairing these leaks and performing assessments as part of our root cause analysis to see if any of the leaks are the result of similar external forces. Additionally, the leak survey identified 13 grade 3 leaks. Five of these are in close proximity to the Hayward fault and these leaks will also be investigated to confirm if the cause of the leak is related to external forces. We expect to complete this assessment by the end of December, 2013 as well. The remaining grade 3 leaks will be monitored in accordance with our leak survey program. Attached is a map showing the locations of the leaks identified in this survey.

POTENTIAL SOURCES OF IGNITION - A systematic review of ignition sources was also performed. The most probable source of ignition is a transitory ignition source such as a passing vehicle, static discharge or, dropped cigarette. Other utilities in the area (underground electric, electrolysis test stations for gas and water mains, cable, and phone) have been ruled out as a likely or contributing source.

SCHEDULE OF UPCOMING ACTIVITIES –We expect to complete our analysis by January 8, 2014 with a final report to be available by January 15, 2014.

We will provide the next update in conjunction with the final report unless there are additional material issued identified. Please let me know if you have any questions or require further information.

Sincerely,

Jane Yura
Vice President, Risk and Asset Management

Attachment

Cc: Paul Clanon, CPUC
General Jack Hagan, CPUC
Redacted
Laura Doll, PG&E
Bill Gibson, PG&E