PACIFIC GAS AND ELECTRIC COMPANY
San Bruno Gas Transmission Line Incident
Data Response

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QUESTION 5

How does PG&E factor seismic events into their integrity management program for gas transmission pipelines? Please respond for the general case and for the specific case of the Line 132 pipeline and its proximity to major faults in San Bruno and the Crestmoor neighborhood. Use the 1989 Loma Prieta earthquake as an example of PG&E's integrity management program for seismic events for Line 132 with specific details concerning the pipeline's presence in the Crestmoor neighborhood and the rupture site.

ANSWER 5

This question has three parts; a response to each is provided below.

A. General Case. Description of how PG&E factors seismic events into their integrity management program for gas transmission pipelines.

- PG&E Transmission Integrity Management Program (TIMP) is a program established to address the integrity management rules in 49 CFR Part 192 Subpart O. Procedure RMP-01 provides a procedure for the Risk Management Process and defines the gas pipeline risk as the product of Likelihood of Failure (LOF) (from the following threat categories: External Corrosion, Third Party, Ground Movement, and Design/Materials) and the Consequence of Failure (COF). The seismic likelihood of failure component of risk is captured by the Ground Movement threat defined in Procedure RMP-04 (Ground Movement and Natural Forces Threat Algorithm; See NTSB 003-001 for copies of RMP 01 and RMP 04).

- PG&E Procedure RMP-04 defines the ground movement threats by using a ranking system. The seismic hazard ranking analysis incorporates the following factors from a seismic event: shaking intensity fault crossing hazards, liquefaction potential, seismic triggered landslide potential, girth weld age, and mitigation status. The resulting risk calculation is used to help prioritize assessments and to plan mitigations.

B. Specific Case: Line 132. Description of how PG&E factors seismic events into their integrity management program for Line 132 and its proximity to major faults in San Bruno and the Crestmoor neighborhood.

- PG&E Transmission Integrity Management Program (TIMP) described above is applied to Line 132 in San Bruno in the same manner as other gas transmission pipelines in PG&E's system.

- Although the peak ground accelerations in the San Bruno neighborhood are expected to be high due to an earthquake on the nearby San Andreas Fault, the soil in the area of the Line 132 rupture is not considered to be unstable or normally subject to liquefaction. Line 132 in the Crestmoor neighborhood does not cross the San Andreas Fault.

C. 1989 Loma Prieta Earthquake Example. 1989 Loma Prieta Earthquake as an example of PG&E's integrity management program for seismic events for Line 132 with specific details concerning the pipeline's presence in the Crestmoor neighborhood and the rupture site.

- RMI-04 pinpoints and prioritizes pipeline inspections following large seismic events. See attached copy of RMI-04. The algorithm utilizes realtime earthquake data from the USGS, when available. In the event realtime seismic data is not readily available, model earthquake data based on several large historic quakes on the San Andreas Fault are used to simulate ground shaking.

- As RMI-04 did not exist at the time of the 1989 Loma Prieta Earthquake, to illustrate PG&E's integrity management program for Line 132 for the 1989 Loma Prieta Earthquake, a M7.2 (magnitude 7.2) earthquake on the Peninsula segment of the San Andreas Fault, modeled after an 1838 earthquake on the San Andreas Fault, was analyzed. The modeled event envelopes the Loma Prieta Earthquake in terms of shaking levels in the vicinity of the Line 132 ruptured segment (segment number 180, within MP 39.04 to 39.37).

- The RMI-04 analysis results indicate that the modeled earthquake would not trigger an inspection along Line 132 in the vicinity of the ruptured segment (segment number 180, within MP 39-04 to 39.37).