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

PG&E Data Request No.:	NTSB_035-004		
PG&E File Name:	San Bruno GT Line Incident_DR_NTSB_035-004		
Request Date:	December 9, 2010	Requesting Party:	NTSB
Date Sent:	December 20, 2010	Requestor:	Operations (Chhatre/Budinski)

QUESTION 4

Detail PG&E's earthquake engineering evaluation of the Line 132 pipeline at the time of design and installation. Provide specific details of earthquake engineering practices used for the pipeline design and installation through the Crestmoor neighborhood and the rupture site.

ANSWER 4

In 1956, the ruptured segment of Line 132 was relocated in response to the Crestmoor expansion. The objective of the pipeline relocation was to re-align the new segment within the existing right-of-way of Glenview Drive. No site specific earthquake engineering investigation was performed for the 1956 relocation. Circa 1956, little was understood about the seismic performance of buried pipelines. Accordingly, seismic evaluation of pipelines like Line 132 was not the standard practice in 1956. In fact, it was not until 1974, following the 1971 San Fernando Earthquake, that the American Society of Civil Engineers (ASCE) formed the Technical Council on LifeLine Earthquake Engineering (TCLEE) to study, among other things, the seismic effects on pipelines. The formation of TCLEE was 18 years after the 1956 Line 132 relocation. (See attached paper, "Lifeline Earthquake Engineering" August 1991.)