



**Date:** 11/18/16

**To:** Edith Moreno, Environmental Compliance Lead, San Diego Gas & Electric (SDG&E)

**From:** Kumar Valsala, Sr. Transmission Line Engineer, Burns & McDonnell

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**Subject:** Seismic Considerations for Overhead Design & Construction (APM GEO-1)

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This memorandum has been prepared to assist San Diego Gas & Electric Company (SDG&E) in satisfying Applicant Proposed Measure (APM) GEO-1: Seismic Standards, which is included in the Mitigation Monitoring Compliance and Reporting Program (MMCRP) from the Final Environmental Impact Report (FEIR) for the Sycamore-Peñasquitos 230-kV Transmission Line Project (Project).

APM GEO-1: Seismic Standards states:

“Design and construction of overhead facilities would conform to CPUC General Order 95, industry practice, and SDG&E internal structural design requirements to minimize damage from seismic shaking.”

The structural design on overhead structures for the Project was performed in accordance with the current version of the State of California Rules for Overhead Electrical Line Construction (General Order No. 95 (G.O. 95)), San Diego Gas & Electric Company (SDG&E) design practices “Guidelines for Establishing Loading Requirements for Steel Poles and Lattice Towers” (January 04, 2012), American Society of Civil Engineers (ASCE) Manuals and Reports on

Engineering Practice No. 74 "Guidelines for Electrical Transmission Line Structural Loading (Third Edition)" (ASCE No. 74), and recommendations contained in "Subjective Estimates of Wind and Ice Extremes in San Diego County (Prepared for SDG&E by Sargent & Lundy, dated April 14, 1993)".

In accordance with Section 3.6 Earth Quake Load of ASCE No. 74 transmission structures need not be designed for ground-induced vibrations caused by earthquake motion because, historically, transmission structures have performed well under earthquake events, and transmission structure loadings caused by wind/ice combinations and broken wire forces exceed earthquake loads. (Excerpt from ASCE 74 Section 3.6 is attached.)

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EXCERPT FROM ASCE No. 74 Section 3.6 (Third Edition)

### 3.6 EARTHQUAKE LOAD

Transmission structures need not be designed for ground-induced vibrations caused by earthquake motion because, historically, transmission structures have performed well under earthquake events, and transmission structure loadings caused by wind/ice combinations and broken wire forces exceed earthquake loads. This may not be the case if the transmission structure is partially erected or if the foundations fail due to earth fracture or liquefaction.

Transmission structures are designed to resist large, horizontal loads of wind blowing on the wires and structures. These loads and the resulting strengths provide ample resistance to the largely transverse motions of the majority of earthquakes. Decades of experience with lines of all sizes has shown that very infrequent line damages have resulted from soil liquefaction or when earth failures affect the structural capacity of the foundation.