Southern California Edison
2022-WMPs – 2022 Wildfire Mitigation Plan Updates

DATA REQUEST SET C a l A d v o c a t e s - S C E - 2 0 2 2 W M P - 0 9

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Response Date: 3/23/2022

Question 02:
On p. 31 of SCE's 2022 WMP, SCE states "a study was conducted to determine the susceptibility of the 2018 to 2020 covered conductor installations to Aeolian vibration." During the March 10, 2022 WMP Workshop, an SCE representative discussed concerns about Aeolian vibration.
A. Please describe the methodology of the referenced study.
B. Please provide a copy of the referenced study.
C. Please describe the basis for SCE's concern about Aeolian vibration. In other words, how did SCE become aware of the need to conduct a study?

Response to Question 02:

A. The study followed the subsequent process:
    1. Identify segments that meet the vibration damper installation requirements outlined in SCE's design and construction standards.
        - SCE's standard dictates that vibration dampers shall be installed in areas at 3,000 ft or below in elevation. Therefore, the study only focused on covered conductor installations that meet this criteria.
    2. Analyze and categorize the terrain surrounding the covered conductor based on terrain categories outlined by the International Council on Large Electric Systems (CIGRE).[1]
        - The four categories are outlined in the table below. A lower terrain factor indicates a higher susceptibility to vibration.

Terrain Factor	Terrain Description
1	Open water or desert, snow cover, no trees, no obstructions
2	Open, flat rural areas with no obstructions and few and low obstacles
3	Open, flat or undulating. Low density housing, open woodland with hedgerows and small trees, prairie, tundra.
4	Built-up areas with some trees and buildings (e.g. suburbs, small towns, woodlands and shrubs, broken country with large trees, small fields with hedges)

    3. Calculate the average daily duration of wind speeds from 2-15 MPH flowing across

[1] CIGRE 273: "Overhead Conductor Safe Design Tension with Respect to Aeolian Vibration"

the span.

- A higher duration indicates a higher susceptibility to vibration.

4. Assign an aeolian vibration susceptibility ranking
    - SCE assessed the combination of terrain and wind duration to rank the span's vibration susceptibility to high, medium, and low.

B. Please refer to the attached spreadsheet for the final results of the vibration susceptibility analysis on structures scoped for vibration damper retrofit. Note that theoretical useful life calculations were also used to make the final scope recommendation.

The following table provides the breakdown of structures in high and medium vibration susceptibility areas.

Vibration Susceptibility	Number of Structures
High	1,095
Medium	1,658

C. In 2019, SCE conducted a field vibration study on a covered conductor installation in SCE's territory. The purpose of the study was to determine the level of Aeolian vibration on covered conductor and verify the effectiveness of vibration dampers. The study utilized vibration recorders to monitor a 2-wire covered conductor span over a two-week interval, in which one wire had a damper installed and the other had no damper installed. The study concluded that covered conductor could experience strain from Aeolian vibration.

Additionally, while the assessment was in process, SCE began observing cases of Aeolian vibration occurring on its covered conductor installations. In two specific instances, SCE was made aware of the vibration through customer noise complaints when the vibration would cause dead-end wildlife covers to clatter against the covered conductor. The installation of vibration dampers stopped the vibration and the resulting noise.

Based on the observed vibration, the results of the field study, and additional analysis, SCE concluded that vibration dampers will be needed on covered conductors that meet certain tension criteria. In October 2020, SCE published the vibration damper standard outlining the vibration damper installation requirements. SCE also decided to evaluate the covered conductor installations constructed prior the standard being published for vibration susceptibility.