Corridor Induction Risk Assessment of Out-of-Service Transmission Lines in SDG&E HFTD

Executive Summary

San Diego Gas & Electric (SDG&E), in collaboration with an engineering consulting partner, has completed a detailed technical study evaluating the corridor induction risks associated with out-of-service transmission lines located within its High Fire Threat District (HFTD). This report presents a summary of the key findings and conclusions from that study, focusing on the three de-energized transmission circuits in the HFTD with corridor induction potential—TL99901, TL99904, and TL99925—totaling 14.7 miles.

The study assessed both electrostatic and electromagnetic induction risks under various grounding configurations and evaluated potential ignition hazards associated with each. Based on quantitative modeling and engineering analysis, the results demonstrate that the calculated energy levels of the three transmission lines in the isolated configuration (i.e., ungrounded) presents extremely low ignition risks. This in conjunction with the fact that these lines undergo regular inspections and are maintained in accordance with all applicable standards and requirements, as if they were energized ensures that there is an extremely low risk of ignition.

Following this assessment, SDG&E has determined that its current grounding practices along with its inspection and maintenance practices for the out-of-service transmission infrastructure does not require modification at this time.

1. Scope

This report addresses the induction risks of out-of-service transmission lines in SDG&E's HFTD. The circuits analyzed include:

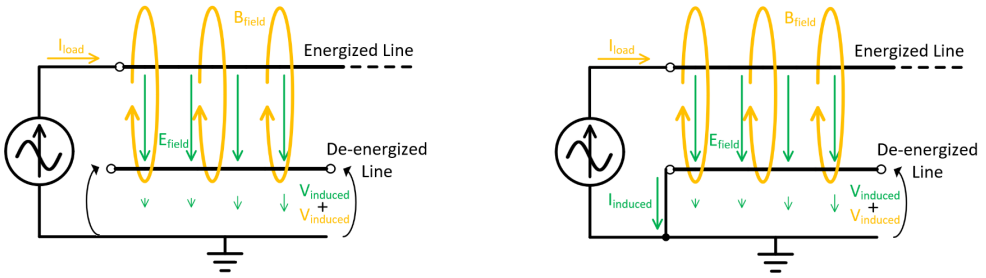
- TL99901 – 7.6 miles
- TL99904 – 67 miles
- TL99925 – 0.3 miles

All circuits are currently isolated (ungrounded). The analysis focuses on electrostatic and electromagnetic induction risks and evaluates grounding alternatives.

2. Induction Mechanisms

The following table summarizes the two primary induction mechanisms:

Type	Mechanism	Current Flow Requirement
Electrostatic	Electric field coupling	Requires one ground point
Electromagnetic	Magnetic field coupling	Requires two ground points



Normal Operation - Ungrounded System

Fault Action - Induced Electrostatic Current Flow Only
No Induced Electromagnetic Current Flow

Reference: Robert James et al., PG&E (2024), 'De-energized Lines Can Still Start Fires'.

3. Circuit Risk Profiles

A summary of circuit risk profiles is shown in Appendix A.

4. Grounding Alternatives – Summary Evaluation

A comparative summary of grounding alternatives is provided below:

Grounding Type	Energized to out-of-service Fault Potential	Power Loss	Electrostatic Potential	Electromagnetic Potential
Ungrounded	Lowest	Lowest	High	None
Multiple Opens and Ungrounded	Lowest	Lowest	Variable	Variable
Single-Point	High	Medium	Medium	High
Two-Point	High	High	Low	Medium
Multipoint	High	Highest	Lowest	Low

5. Conclusions

- The three circuits—TL99901, TL99904, and TL99925—present minimal induction risk in their current isolated (ungrounded) configurations.
- These lines undergo regular inspections and are maintained in accordance with all applicable standards and requirements, as if they were energized.
- Electromagnetic induction is not a concern due to the absence of dual grounding paths, which are required for current flow.
- Electrostatic induction is measurable but would pose an extremely low risk of ignition or insulation failure. Importantly, electrostatic induction results in a capacitive discharge, which is inherently self-limiting and of short duration, posing less ignition risk than electromagnetic induction, which can produce continuous current flow under faulted conditions.
- Alternative grounding alternatives to the current SDGE practice of isolated configurations (e.g., single-point, two-point, or multipoint grounding) introduce greater risks, including energized-to-de-energized fault paths, increased power loss, and potential relay coordination issues.
- Considering the current inspection and maintenance practices of treating the out of service transmission lines as energized and the current grounding method utilized, the additional risk posed by these transmission lines is extremely low.