ARBOR GLOBAL
Arboriculture & Vegetation Management Consulting

November 15, 2022

To whom it may concern:

From September 2021 to October 2022, I worked with ████████ and other PG&E team members to provide guidance and feedback on a revision of their Tree Assessment Tool (TAT). PG&E has been using this tree risk assessment tool to identify trees to be removed as part of their Enhanced Vegetation Management Program on select portions within PG&Es service territory deemed to be at highest risk of wildfire. PG&E recognized that the current version of this tool included elements that did not effectively identify potentially significant defects and conditions, and in other cases over-rated certain tree conditions. This revision was designed to correct these elements and significantly enhance the TAT's ability to reliably assess tree risk to all of PG&E overhead electric distribution facilities.

PG&E requested my review and input based upon my extensive, education, training and international experience in both utility line clearance program design, administration and direction, and tree risk assessment.

Based upon observations performed at various stages of the PG&E TAT revision process, I have concluded:

- The revised, overall tree risk assessment process is both reasonable when applied to trees tall enough to strike electrical facilities and when steps are correctly followed by qualified field inspectors.
- The attributes chosen to determine abatement decisions are supported by underlying PG&E data, and my extensive experience, education and training in Utility Tree Risk Assessment.
- The way in which the attributes are captured and calculated appears to reasonable and quantitatively maximizes the inference value of each of the attributes (0-100 scale vs, high/med/low buckets).
- The quantitatively captured attributes set the revised TAT apart from other recognized hazard tree assessment tools that rely more on professional judgement expressed qualitatively that result in less precise or consistent results.
- As appropriate, attributes are weighted in relation to each other that better assesses the elevated risk associated with certain combinations of attributes as shown in tests that properly recognized and accounted for these characters.
- This revision of the TAT should result in more consistent, reliable estimates of failure and strike probability that greatly enhance PG&E's ability to assess and manage vegetation fall-in risk while reasonably minimizing mitigation work on low-risk trees.
- The probability-based abatement thresholds that have been set based on HFTD tier designation are an improved means to manage risk posed by trees or parts of trees falling and striking electrical facilities throughout PG&E's service territory.

I tested this tool several times during this process to understand how the TAT would perform in real-life situations under different scenarios. My significant observations from this testing included:

- Trees that caused prior incidents due to whole tree failure fall-in when run through the revised TAT resulted in risk ratings that required mitigation as expected.
- Trees that should be considered low risk when run through the TAT received risk ratings that appropriately preserved these trees as expected.
- When I found results where hazard trees were not identified, the PG&E team made modifications to correct the deficiencies.

In October 2022, I was provided an overview of the results of field testing of the revised TAT. The field testing methodology employed by PG&E to validate results appears sound and appropriate to determine the reasonable reliability of the revised TAT. The results of PG&E's and my testing demonstrate that the revised tool consistently produces what I would consider a reasonably reliable rating for entire tree/trunk fall-in risk. The Partial Trunk and Branch Assessment capabilities of the revised TAT also appear to be producing a reasonably reliable result. PG&E should expect to learn more and identify further improvements with expanded use of the revised TAT. This is especially true for tree scenarios that are more rarely encountered and may not have been included in the testing sample.

In closing, I find that this revised TAT represents a major leap forward in PG&Es process for reliably assessing hazard trees and, when adopted, will provide an effective tool to support PG&E's ability to better identify and manage the risk that hazard trees pose. The assessment questions are carefully crafted and weighted in a quantitative way that should maximize reliable and reasonable conclusions from observable tree and site conditions. This innovative method for assessment sets the revised TAT apart from other such assessment tools that I have reviewed and applied, and represents a breakthrough in the way hazard tree assessment can be performed.

I endorse proceeding with the application of this revised TAT tool in PG&E operations to more reliably assess tree and tree part fall-in risk to PG&E facilities. I further encourage PG&E to adopt an ongoing TAT monitoring and improvement strategy to identify and further enhance this tool's ability to reliably quantify the probability of fall-in incidents and the threshold setting variables to further enhance PG&Es overall vegetation risk management.

Sincerely,

Kevin K. Eckert
ISA Board Certified Master Arborist WE-1785BU
ISA Certified Utility Specialist
Tree Risk Assessment Qualified: Practitioner, Instructor and Mentor Instructor
President and Managing Director, Arbor Global LLC/Hong Kong Ltd.