

DOCKETED

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Wind Turbine Vortices

Additional submitted attachment is included below.

W. David Wardall
17069 Lambert Road
Ione CA 95640

November 29, 2023

California Energy Commission
715 P Street
Sacramento CA 95814

RE:

I managed the CAL FIRE Aviation Operations for 34 years. I hold several FAA licenses including: Airline Transport Pilot, Flight Engineer, Designated Aircraft Structures Engineer, Flight Instructor and Maintenance Inspector. I believe I am Qualified to Provide critical information about **VORTICES** produced by the giant 600+-ft. wind turbine generators.

I will keep this short and to the point. The vortices produced by these giant wind turbines are small horizontal tornados that will travel a few miles beyond each turbine. Collectively, the downstream and side areas will have significant dangerous air currents that will roll and aircraft upside down and induce significant loads, stress and structural failure.

There are many types of vortices. The vortices involving wind turbines are typically horizontal. Vortices. Vortices created from mountain ridges are on the aft, lee side of the prevailing wind. Exhibits A and B show a C-130 aircraft encountering significant downslope vortices resulting on wing overload and failure. I was boots on the ground as one of the consulting structures engineers on this accident circa 2000. Other types of Vortices are included in Exhibits C, D and E. Exhibit E is wing vortices. Each end of the wing would approximately illustrate the end of a wind turbine blade vortices. Those large turbine blades mimic a wing and have a high pressure side and a low pressure side. The air spilling over the tips of those blades produces vortices.

This results in a no fly zone and retardant drops are useless as the retardant drops from a safe overflight altitude dissipating and not hitting the ground.

Questions, please call me. 209-274-9160.

Respectfully.

W. David Wardall

Exhibit A

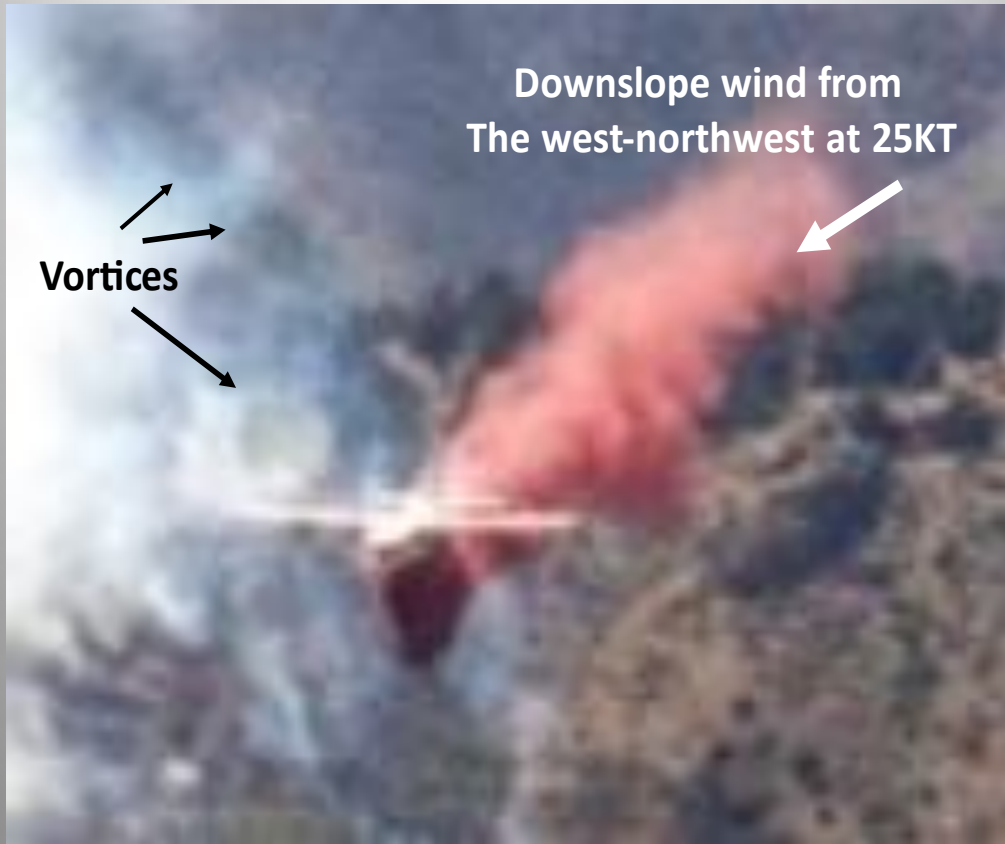


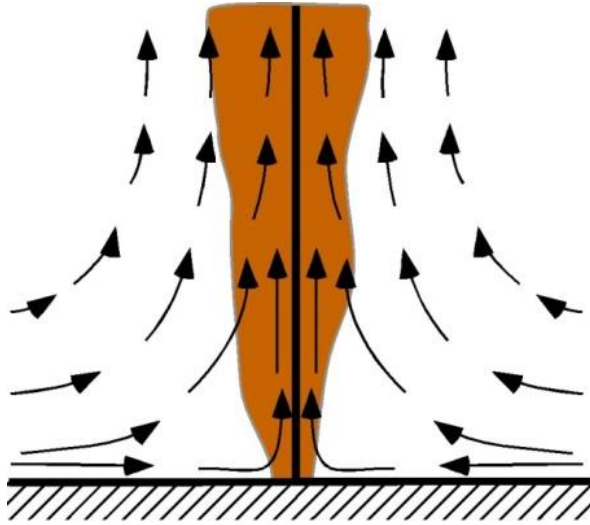
Exhibit B



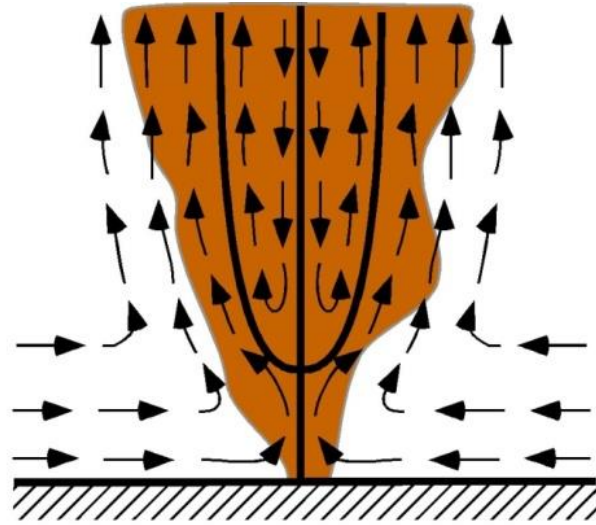
Exhibit C



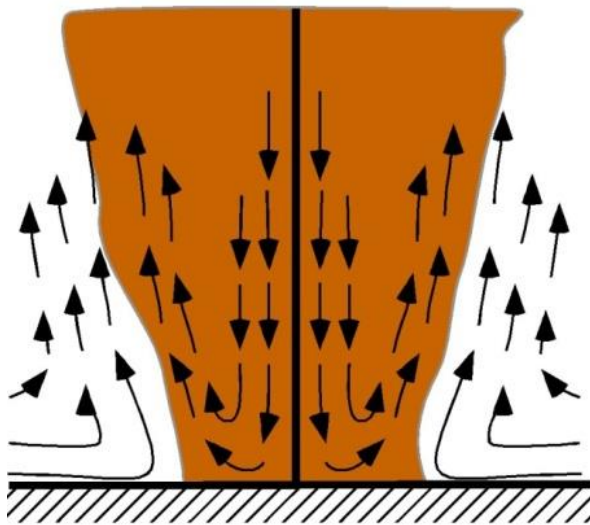
Exhibit D



A. central updraft



B. vortex breakdown



C. central downdraft



D. suction vortices within larger tornado

Courtesy of the American Meteorological Society

Exhibit E

