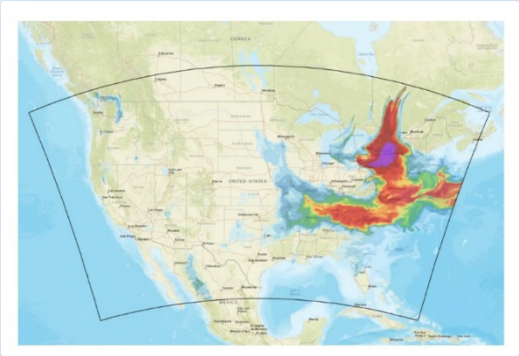
Supplemental Project Notice

WILDFIRE SMOKE HEALTH AND SAFETY HAZARDS



Map of fine particulate matter ($PM_{2.5}$) concentrations showing wildfire impacts, June 28, 2023 (source: NOAA)

PROJECT HIGHLIGHTS

- Guidance on predicting, monitoring, and communicating wildfire smoke concentrations for the utility workforce
- Application of engineering and adminstrative controls, as well as PPE, to reduce occupational wildfire smoke exposure
- Understanding how fuel type impacts smoke composition and health effects, and how these differences may impact the workforce and utility operations
- Key input to inform minimum approach distance (MAD) for live work and impacts of smoke on electrical equipment
- Deliverables timed to provide results in advance of wildfire seasons

Background, Objectives, and New Learnings

Wildfires are occurring with increased frequency and impact across many geographic areas. While these events have historically been primarily limited to western North America, in recent years—particularly the summer of 2023—impacts have been felt in areas with limited experience with these risks.

Wildfires generate smoke plumes that can contain high concentrations of fine particulate matter ($PM_{2.5}$), carbon monoxide (CO), and a variety of hazardous air pollutants (HAPs). Short-term exposure to wildfire smoke is associated with irritation of the eyes and respiratory tract, reductions in lung function and other pulmonary effects, as well as cardiovascular effects. Electric utility workers on the front lines of these events may be exposed to pollutants at elevated concentrations; therefore, adequate protection of employees is a key priority.

Several states in the western United States have regulations for the protection of outdoor workers that are tied to the Air Quality Index (AQI) for various pollutants. Given the increasing threat posed by wildfire smoke to occupational health and safety, it is possible that other states may develop similar standards. Additionally, many companies are creating their own internal wildfire smoke programs. This research aims to holistically address several critical open questions, as described below under Project Approach.

Benefits

Results from this research are anticipated to directly support electric utility companies in identifying, monitoring, and mitigating wildfire-related health and safety risks to utility staff. Actionable information and guidance on monitoring technologies, best practices related to controls, and increased understanding of differential impacts of exposure to smoke from various types of fires, are expected to inform the development of sound safety management practices, supporting the health of the workforce and, by extension, the communities in which workers live. Results may also be used by states to inform the development of regulations to protect workers.

Project Approach and Summary

This research is comprised of a cohesive set of four project components, all aimed at reducing occupational health and safety impacts of wildfire smoke.

These components are intended to address the questions outlined above.

1. **Prediction, Monitoring, and Communication**: Optimal hazard assessment approaches will be identified for utility field employees, including air-quality modeling to forecast smoke exposure levels, and monitoring of smoke concentrations. Monitoring could be conducted by, for example, vehicle-mounted or wearable sensors. This component will also develop tools with which to communicate smoke monitoring to employees.
2. **Controls:** In this topical area, best practices and gaps related to engineering and administrative controls (as well as PPE) will be identified. Engineering controls can include reducing smoke exposure by air filtration in vehicles and buildings. Administrative controls could include implementation of specific work/rest schedules based on AQI. There is an important identified need around arc-rated and fire-resistant respirators (e.g., N95) that reduce smoke exposure and provide the necessary protection from electrical hazards. This project will also evaluate the extent to which this specialized equipment could be or is being developed.
3. **Smoke Composition:** As wildfires encroach on the wildland-urban interface (WUI), the composition of smoke may change, shifting from purely vegetation-based combustion to include structures and vehicles. There is currently minimal information about differing composition and health effects by fuel type. This project will further understanding of this issue by surveying the available literature and partnering with the appropriate laboratories to conduct testing.
4. **MAD and Equipment:** Minimum approach distance is influenced by atmospheric conditions; however, the extent to which wildfire smoke (particularly PM2.5) changes this distance is not fully understood. This project will investigate this, as well as the impacts of settled smoke particle on electrical equipment, in a laboratory setting.

Deliverables

The following work products are expected to be developed from this project. ***All deliverables will have dedicated sections/components that specifically outline implications of the findings for electric utility operations***.

- Bimonthly funder webcasts to share interim project results and foster member peer communication
- Summary of resources and best practices on wildfire smoke prediction/forecasting and monitoring
- Technical brief on feasible vehicle-mounted and wearable air quality sensors
- Fact sheet for employees on wearable smoke sensors
- Summary of best practices on controls (engineering, administrative, PPE)) to reduce smoke exposure in utility workers
- Technical brief on the commercial landscape as it relates to arc-rated and FR respirators
- Technical report on differences in smoke composition and expected health impacts by fuel type
- Technical report on smoke impacts on MAD and equipment
- Culminating guidance document on the development of utility wildfire smoke management programs

Price of Project

The price to participate in this project is expected to be $130K for the full two-year duration of the research ($65K/year), based on six funders. This project qualifies for Self-Directed and Tailored Collaboration funding.

Project Status and Schedule

EPRI anticipates a start date of January 2024, with completion of the research in 24 months. Interim results and deliverables will be available (1) in advance of the 2024 wildfire season (i.e., in summer/early fall 2024); and (2) in advance of the 2025 wildfire season. This timing is intended to maximize the ability of funders to apply findings at key junctures.

Who Should Join

Power generation owners and operators, transmission and distribution companies, and electric utility services contractors worldwide.

Contact Information

For more information, contact the EPRI Customer Assistance Center at 800.313.3774 (askepri@epri.com).

Technical Contact

Annette Rohr at 425.298.4374 (arohr@epri.com)

Additional Contacts

John Shober at 970.302.5556 (jshober@epri.com)
Eladio Knipping at 202.293.6343 (eknipping@epri.com)
Gary Sibilant at 704.595.2598 (gsibilant@epri.com)

Product ID: 3002028621 **Project ID:** 1-118874 **December 2023**

EPRI
3420 Hillview Avenue, Palo Alto, California 94304-1338 USA • 800.313.3774 • 650.855.2121 • askepri@epri.com • www.epri.com