EPA United States Environmental Protection Agency

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EPA scientists evaluate advanced technologies for measuring ethylene oxide in Puerto Rico

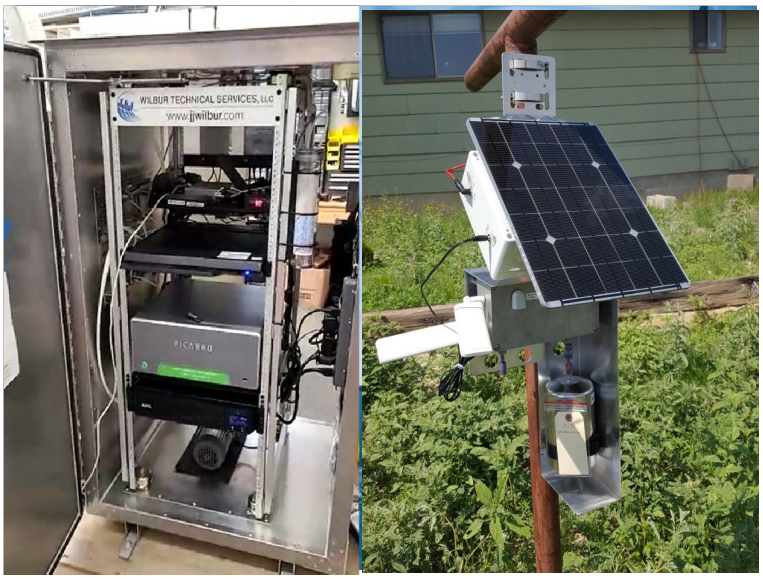
Innovative Science for a Sustainable Future

Background

Ethylene oxide (EtO) is a colorless gas used to sterilize medical equipment and produce a range of products, including antifreeze, textiles, plastics, detergents, and adhesives. Numerous communities across the U.S., including several in Puerto Rico, are located near known EtO emission sources. There are potential health risks associated with exposure to EtO and prolonged exposure can contribute to increased cancer risk. Accurate measurements of EtO concentrations near emitting facilities and nearby communities are needed to better understand EtO emissions and concentrations. It is currently difficult to measure low levels of EtO in the air using existing methods and research is needed on new measurement approaches to better characterize EtO.

Study Overview

EPA scientists are working with stakeholders to develop and evaluate cost-effective measurement tools to better understand EtO emissions and concentrations in communities located near emission sources. EPA researchers plan to test several of these new technologies near a sterilization facility in Fajardo, Puerto Rico, in 2024. During the field research, scientists will evaluate the effectiveness of these technologies in measuring EtO levels within the community of Fajardo and near the commercial sterilization facility. The research project will evaluate the performance of the new EtO measurement techniques and is not being conducted for regulatory purposes.



Left: EtO field air monitoring system to be evaluated in Puerto Rico. Right: Remotely operated canister sampler (ROCS) in the field.

Research Approach

During the field study, EPA scientists will test multiple types of advanced EtO measurement technologies in Fajardo, Puerto Rico, including:

- A trailer-based custom air monitoring system that continuously measures EtO and meteorological data at one stationary location.
- A mobile-based EtO monitoring system to measure spatial differences in EtO concentrations around the facility and in surrounding communities.
- A solar-powered, remotely operated canister sampler (ROCS) and other canister triggering systems that can collect air samples for offline, laboratory analysis.

Anticipated Results

The results will include field data on the performance of the advanced measurement tools operating in communities and near sources; information on how the facility emissions impact local EtO concentrations; and insights on EtO emissions detection that may inform local agencies and industry regarding potential emissions mitigation strategies. Research results will be shared with the Fajardo community and with the public through meetings to be held following data analysis, and through a scientific journal article publication.

Related Links

EPA Ethylene Oxide Website:
www.epa.gov/hazardous-air-pollutants-ethylene-oxide
EPA Actions to Reduce Risk:
www.epa.gov/hazardous-air-pollutants-ethylene-oxide/actions-protect-workers-and-communities-ethylene-oxide-eto
EPA Ethylene Oxide Explained:
https://www.epa.gov/system/files/documents/2023-11/final-virtual-eto-2-pager-mb.mn-changes-incorporated-v10-002.pdf

Contacts

Technical Lead:
Ingrid George
George.ingrid@epa.gov

Region 2 Lead:
Ysabel Banon
Banon.ysabel@epa.gov

Region 2 Caribbean Environmental Protection Division (CEPD):
Alex Rivera
Rivera.alex@epa.gov

Keila M. Pagán-Incle
Pagan-incle.keila@epa.gov

Brenda Reyes
Reyes.brenda@epa.gov

April 2024