United States
Environmental Protection
Agency

# Ethylene Oxide
# Air Monitoring and Modeling

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**August 2019**

# Monitoring for Ethylene Oxide (EtO)

- **Monitoring <u>inside</u> the facility boundary is done for multiple reasons….**
  - To show compliance with environmental regulations (e.g., that a company is meeting its emission limits)
  - To show compliance with facility worker health and safety requirements
  - To gather detailed information for improved computer-generated estimates of downwind concentrations outside the facility boundaries (computer modeling of “ambient air”)

# Monitoring for Ethylene Oxide (EtO)

- **Air monitoring <u>outside</u> the facility boundary….**
  - Provides actual concentration values at specific locations at specific times
  - For EtO, we use a “cannister” to collect samples; each sample is typically collected over a 24 hour period and sent to a laboratory for analysis
  - Each sample concentration will reflect the influence from all sources (including “background” concentrations)
  - One, or a few, samples collected over a short period of time (e.g., a few weeks or less) will not provide sufficient information to evaluate long-term risk
  - Ambient monitoring is not required for EtO under the Clean Air Act regulations for commercial sterilizers

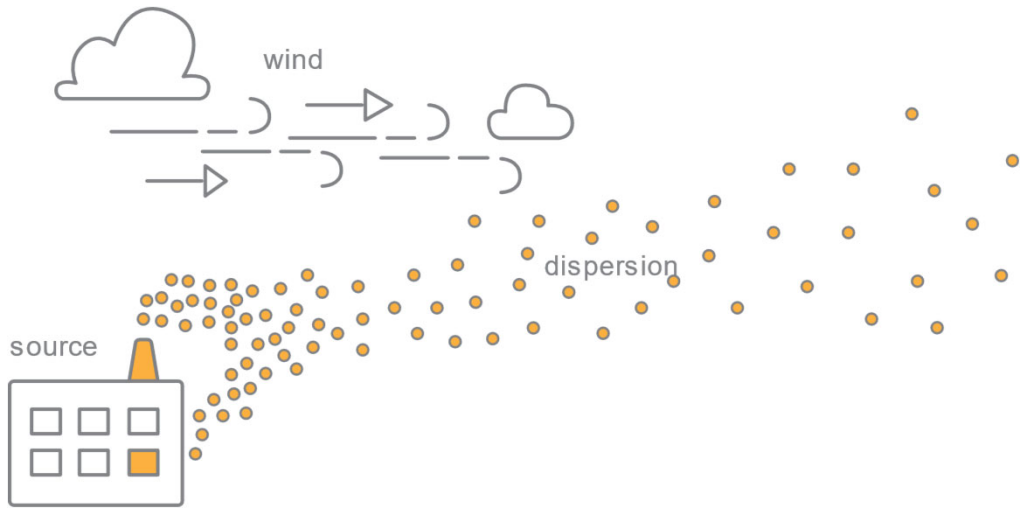
# Monitoring for Ethylene Oxide (EtO)

- **Laboratory Analysis**
  - Many types of samples collected both inside and outside the facility have to be sent to a laboratory to determine how much EtO is present in the sample

# Modeling for Ethylene Oxide (EtO)

## What is an Air Dispersion Model?

- A computer simulation of the movement of a pollutant through time and space




- **Inputs:**
  - Emission and stack/fugitive information
  - Pollutant/chemical information
  - Meteorological data
  - Topography

- **Outputs:**
  - Outdoor air concentrations at predetermined distances (called “receptors”), reflecting 1-hour values which can be averaged to longer periods
  - Air Modeling can quickly and efficiently provide long-term average concentration estimates at any location of interest for chronic risk assessment

# Background Ambient EtO Concentrations

- EPA is working with our state partners (including GA EPD) to better understand the distribution of EtO in air and to identify potential sources

- Recent ambient monitoring data for EtO in multiple locations around the country indicate typical background concentrations on the order of 0.1 to 0.3 micrograms per cubic meter (ug/$m^3$)

- EPA recently analyzed an air sample collected over a 24 hour period on June 14, 2019, by Georgia EPD at the State's South Dekalb monitoring site

  - **Result:** EtO concentration = 0.31 micrograms per cubic meter of air (0.31 ug/$m^3$)

  - This result cannot clearly be linked to a particular source because the South Dekalb monitoring site is not located near an identified industrial source of ethylene oxide. This result in generally consistent with background concentrations seen elsewhere in the country.