Air Toxics: Methods Development and Ambient Measurements

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Background and Impact

- EPA's 2016 updated IRIS unit risk assessment indicates that ethylene oxide (EtO) is approximately a 60x greater health risk than 1985 risk assessment indicated
- NATA 2018 led to identification of 30 EtO-emitting facilities nationwide that could possibly exceed a 100-in-a-million cancer risk level
- ORD and OAR are collaborating to support Regions and communities by developing methods and guidance for monitoring EtO
- ORD/CEMM/AMCD/AAB researchers will deliver a cohesive guidance document for use by labs measuring EtO using EPA Method TO-15A
- This research effort additionally supports EPA's environmental justice goals

Research Plan

Goal: To develop an optimized method and a guidance document for analysis of EtO using EPA Method TO-15A techniques

This research entails a multi-pronged approach including the following:

- Use state-of-the-art VOC concentrator/GC-MS system and silico-ceramic lined canisters
- Attend to cleanliness to facilitate detection levels of 20 pptv – certification of analytical system, canisters, autosampler tower, sampling inlets, dilution systems
- Optimize current canister cleaning methods – precleaning, temperature, number of cycles
- Optimize GC separations of analytes and potential interferents – evaluate GC columns and oven programs
- Optimize SIM/Scan MS acquisition method

Process

Next Steps

- Complete instrument installation
- Verify cleanliness and integrity of complete system flow path and ancillary instrumentation
- Optimize analytical method for EtO
- Finalize SOP
- Analyze ambient samples
- Evaluate the method on other preconcentration/GC-MS instruments as appropriate
- Prepare guidance document

Resources

- Ethylene oxide - additional information: https://www.epa.gov/hazardous-air-pollutants-ethylene-oxide
- AMTIC Website: https://www.epa.gov/amtic
- TO15A: https://www.epa.gov/sites/default/files/2019-12/documents/to-15a_vocs.pdf

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