

South Carolina's Ethylene Oxide Experience

Spring AAPCA Meeting
Salt Lake City, Utah

April 29, 2022

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NATA Released...

- EPA released 2014 NATA to the public in August 2018
- Showed 2 census tracts exceeding (or close to) 100-in-a-million cancer-risk in North Charleston, SC
 - Primary driver was ethylene oxide (EtO)
- Near a chemical manufacturing facility using EtO
 - Facility later named in 2020 Miscellaneous Organic NESHAP (MON) RTR with new EtO requirements
- Facility very close to 7 environmental justice neighborhoods
- Neighborhoods and facility close to an interstate and port

After The Initial Panic.....

- Immediately contacted facility and EJ community leaders
 - Great collaborative partnerships with N Charleston EJ communities for decades
 - Facility has a long-standing Community Advisory Board
- Held 2 community meetings in 2018/2019
 - Many follow-up meetings with community board members
- Committed to do community monitoring/sampling and sharing data
- Created a webpage
 - <https://scdhec.gov/environment/air-quality/national-air-toxics-assessment-and-ethylene-oxide>
- Began monthly sampling in October 2019

Other EtO Sources.....

- Commercial Sterilizer and several chemical manufacturers using EtO in Spartanburg, SC (upstate)
 - NATA didn't show high cancer risk in Upstate
 - At least 1 EJ community several miles away
- Began sampling for EtO in Spartanburg in November 2019

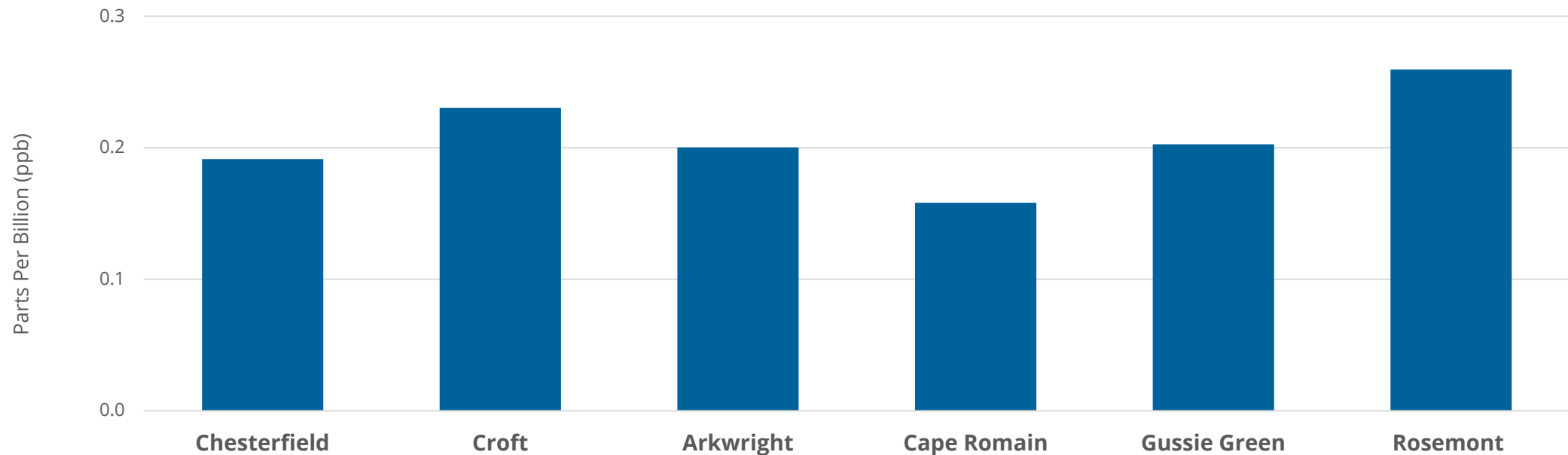


Ethylene Oxide (EtO) 24-hr Sampling Locations

Sampling Date	County/City	Location	Site Description
October 2019 - 2021	Chesterfield	National Air Toxics Trend Site (NATTS)	Rural Site
October 2019 - 2021	Charleston	Cape Romain (Class I Area)	Background Site
November 2019-2021	Spartanburg	Croft Fire Station	Industrial area (multiple EtO emitting sources)
November 2019 -2021	Spartanburg	Arkwright/ ReGenesis Community	Community near multiple EtO emitting sources
November 2019 - 2021	North Charleston	Gussie Green Community Center	Community near EtO source (across Interstate)
November 2019 -2021	North Charleston	Rosemont Park	Community near EtO source

EtO Concentrations

Average Ethylene Oxide Concentrations

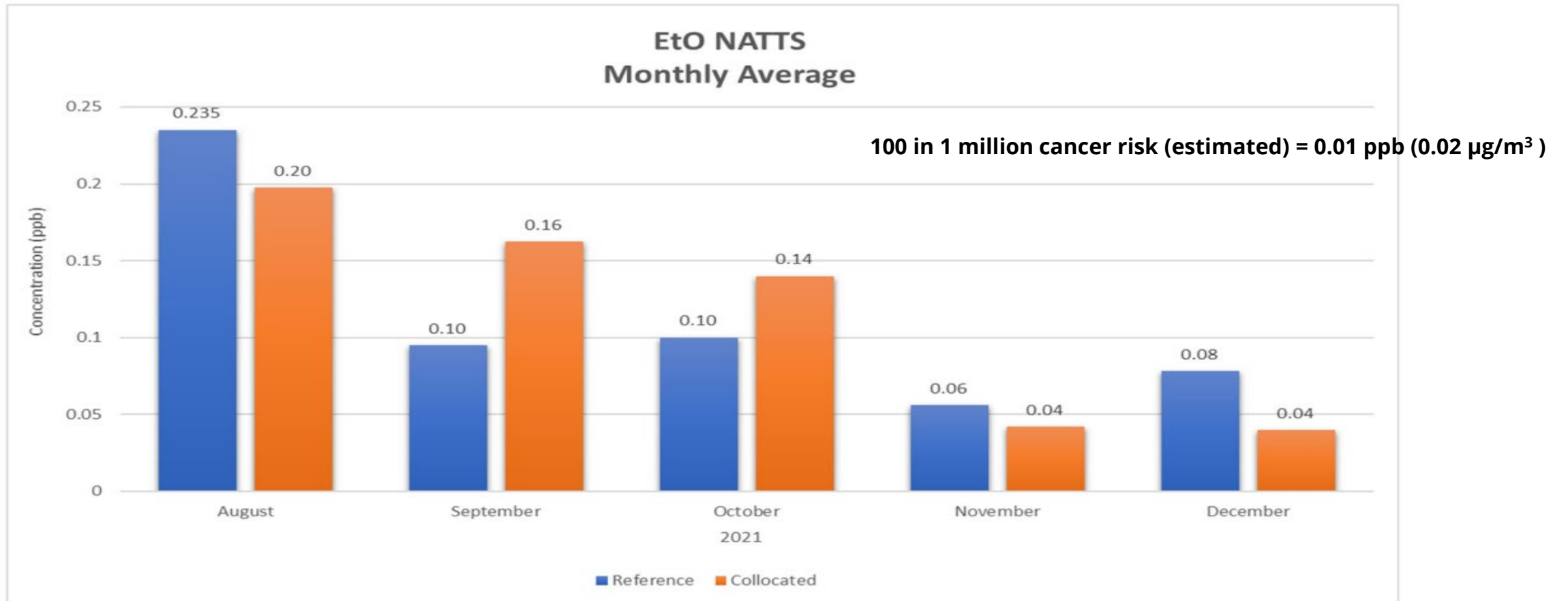


100 in 1 million cancer risk (estimated) = 0.01 ppb (0.02 $\mu\text{g}/\text{m}^3$)

EtO Sampling at Rural NATTS site

- EPA required states to start monitoring EtO at NATTS sites
 - Increase sampling from monthly to every 6 days
 - EPA only provided an additional \$3,000
- South Carolina's NATTS site is a rural background site in Chesterfield (northeastern SC)
 - Very rural, no industry or major traffic close by
- Started more frequent sampling in August 2021
 - Collocated samplers

Rural NATTS Site EtO Results



Community-Scale Air Toxics Monitoring Competitive Grants

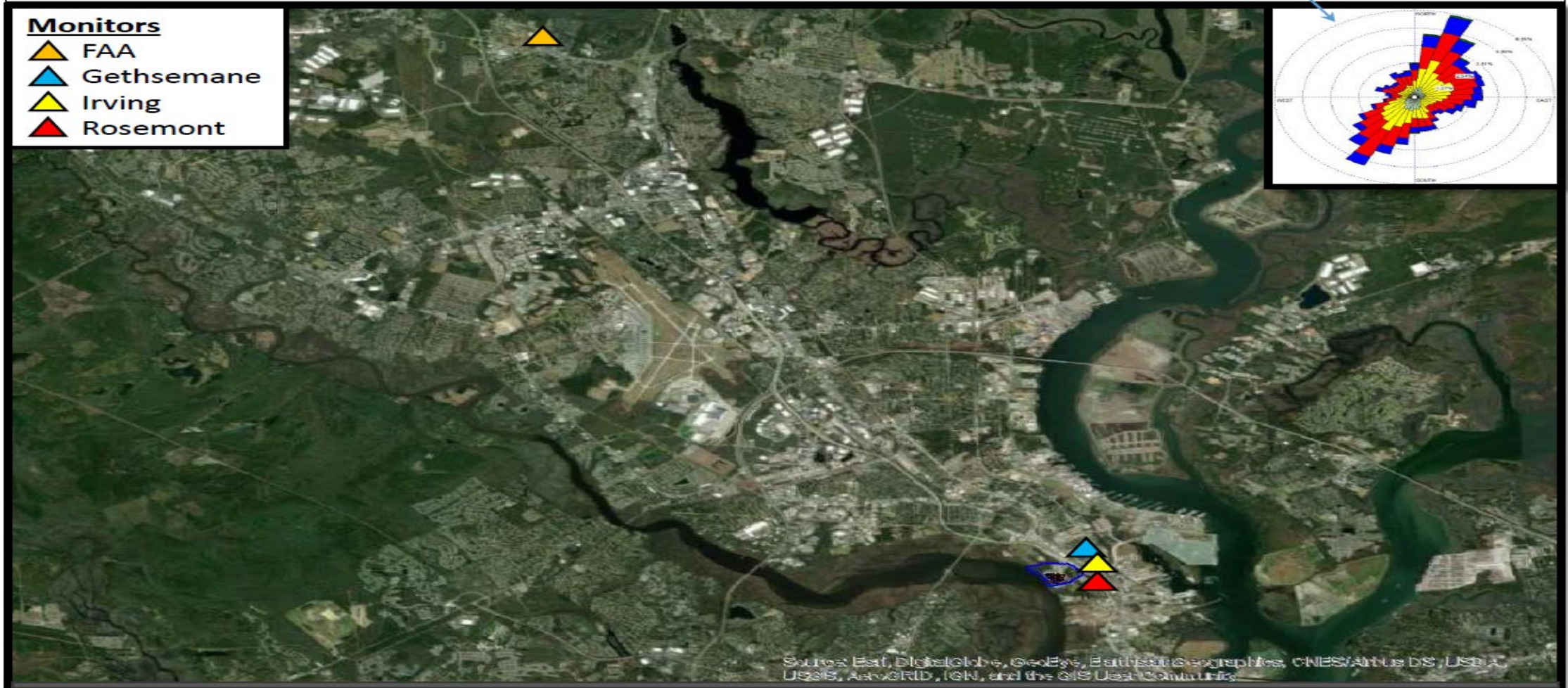
- SC DHEC awarded \$261,128
- Awarded in January 2021
- EtO sampling in North Charleston (every 6 days)
- 1 year of sampling
- Share data (webpage), community meetings
- 4 sampling locations:
 - 3 in communities
 - 1 near high traffic area, no known EtO emitting facility nearby (mobile source impact)

North Charleston EtO Monitor Sites and Wind Rose

Wind Rose (CHS 2015-19 - blowing to)

Monitors

- ▲ FAA
- ▲ Gethsemane
- ▲ Irving
- ▲ Rosemont



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Challenges

- Canister theft (adding fencing, signage, lighting)
- Delays in getting data back from EPA's contract lab
 - 3+ months
- Canister leaks - February 2021 guidance for preventing leaks
- Delayed start of sampling for Grant
 - Delays in getting QAPP approved
 - Delays hiring a temporary staff person
 - Start sampling May 2022



Commercial Sterilizer NESHAP

- One affected facility in Spartanburg
- Initial EPA modeling showed cancer risk > 100-in-a-million cancer risk at nearest house across the street from facility
- Facility voluntarily installed negative pressure enclosure and dry-bed scrubber system to capture and control warehouse EtO emissions in 2021
- Updated EPA modeling showed significant reduction in cancer risk

Media/Outside Groups

- ProPublica's "Toxic Maps"
 - <https://projects.propublica.org/toxmap/>
 - 1 chemical manufacturer in Spartanburg was spotlighted
 - Neighborhoods in study called "*sacrifice zones*"
 - No local news outlets picked up the story
- One "positive" article in Charleston newspaper about grant award
- No community "outrage".....*fingers crossed!*

Questions/Unknowns About EtO

- What are the other sources of EtO in rural/background areas? Are mobile sources a contributor? How significant?
- How do the ambient levels of EtO vary regionally and seasonally?
- How long does EtO persist in the atmosphere?
- What is EtO's involvement in atmospheric chemistry and transport?
- What are the best methods to measure EtO? How to improve precision?
- What are the next steps if the presence of EtO is confirmed to be **everywhere?**

EtO Questions

- Sampling/lab analysis:
 - Connie Turner (803)896-0903; turnercp@dhec.sc.gov
- Community Engagement:
 - Monica Taylor (803)898-7678; taylormn@dhec.sc.gov
- Other:
 - Rhonda Thompson (803)898-4391; thompsrb@dhec.sc.gov
- Webpage:
<https://scdhec.gov/environment/air-quality/national-air-toxics-assessment-and-ethylene-oxide>



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