

# **Ethylene Oxide in the Institute and South Charleston Areas**

**August 10, 2021**

WVDEP

601 57<sup>th</sup> Street, SE

Charleston, WV 25304

West Virginia Conference Room

3:00pm-4:00pm

# Ethylene Oxide in the Institute and South Charleston Areas

## **Agenda**

1. Welcome – DEP Cabinet Secretary Harold Ward & BPH Commissioner & State Health Officer Dr. Ayne Amjad
2. Introduction – DEP Deputy Cabinet Secretary Scott Mandirola
3. Uses and Toxicity – Mike Egnor
4. WVDEP/EPA Modeling Results – Jon McClung
5. Air Monitoring Proposal – Renu Chakrabarty
6. Plans for Public Meeting – Laura Crowder
7. Questions

# **Welcome**

Cabinet Secretary Harold Ward

BPH Commissioner & State Health Officer Dr. Ayne Amjad

# **Introduction**

Deputy Cabinet Secretary Scott Mandirola

# **Uses and Toxicity**

Mike Egnor, Air Toxics Coordinator, DAQ

## Uses and Toxicity

- Sterilization Agent
- Raw Material in Chemical Manufacturing
  - Detergents
  - Textiles
  - Personal care
  - Pharmaceuticals
  - Adhesives
  - Plastics

## Uses and Toxicity

- 2016 – EPA reevaluated the Integrated Risk Information System (IRIS) risk factor for EtO
  - Potential risk for lifetime inhalation cancer
  - Used peer review and public comments
  - Revised value shows:
    - 30 times more toxic to adults
    - 60 times more toxic to children

## Uses and Toxicity

- EPA uses National Air Toxics Assessment (NATA)
  - Looks at potential risk
  - A screening tool
  - Taken about every three years, with results 3-4 years later
  - The 2014 NATA was released in 2018
  - Included the 2016 revised USEPA's IRIS risk value for ethylene oxide
  - Estimated total average cancer risk nationally is 30 in a million

[https://www.epa.gov/sites/production/files/2019-08/documents/nata\\_overview\\_-\\_kelly\\_rimer.pdf](https://www.epa.gov/sites/production/files/2019-08/documents/nata_overview_-_kelly_rimer.pdf)



## Uses and Toxicity

- Based on a 2014 NATA list of the top 500 EtO emitters in the US:
- #14 – UCC Institute (Includes a process now owned by Specialty Products) – 2.9088 TPY
- #32 – UCC South Charleston – 0.8282 TPY
- #77 – Bayer MaterialScience (Now Covestro) – South Charleston – 0.0925 TPY

• <https://docs.google.com/spreadsheets/d/1ABvxRe3vgv2AFzVY7sMY7Hzp3fogITC0RyWQRMZOpc/edit#gid=92862556>

## **WV Cancer Data Review**

- WV DHHR compared Kanawha County vs. West Virginia using the WV Cancer Registry
  - No elevated levels of breast, lymphoma, or leukemia found
  - Kanawha County is not significantly higher than other WV counties
  - The areas with the highest levels of these cancers do not match the EPA model
- WV DHHR has an ongoing review looking at cancer rates on a more localized level

# **WVDEP/EPA Modeling Results**

Jon McClung, Planning, DAQ

## Institute, WV

Union Carbide Corporation

- \* EO Distribution

Specialty Products US, LLC

- \* POLYOX

## South Charleston, WV

Union Carbide Corporation

- \* Oxide Adducts
- \* TRITON
- \* Chemical Mixing

Covestro

## EPA HEM-3 and DAQ/EPA HEM-3 Results For Ethylene Oxide

Facility	2014 Airport Met Data	2014 NEI v2
	EtO Cancer Risk (in a million)	EtO Emissions (tpy)
Union Carbide Institute	1290	2.91
Union Carbide South Charleston	997	0.83
Covestro	103	0.0925

\*Results show the maximum inhalation risk (MIR) for the facility at a populated receptor

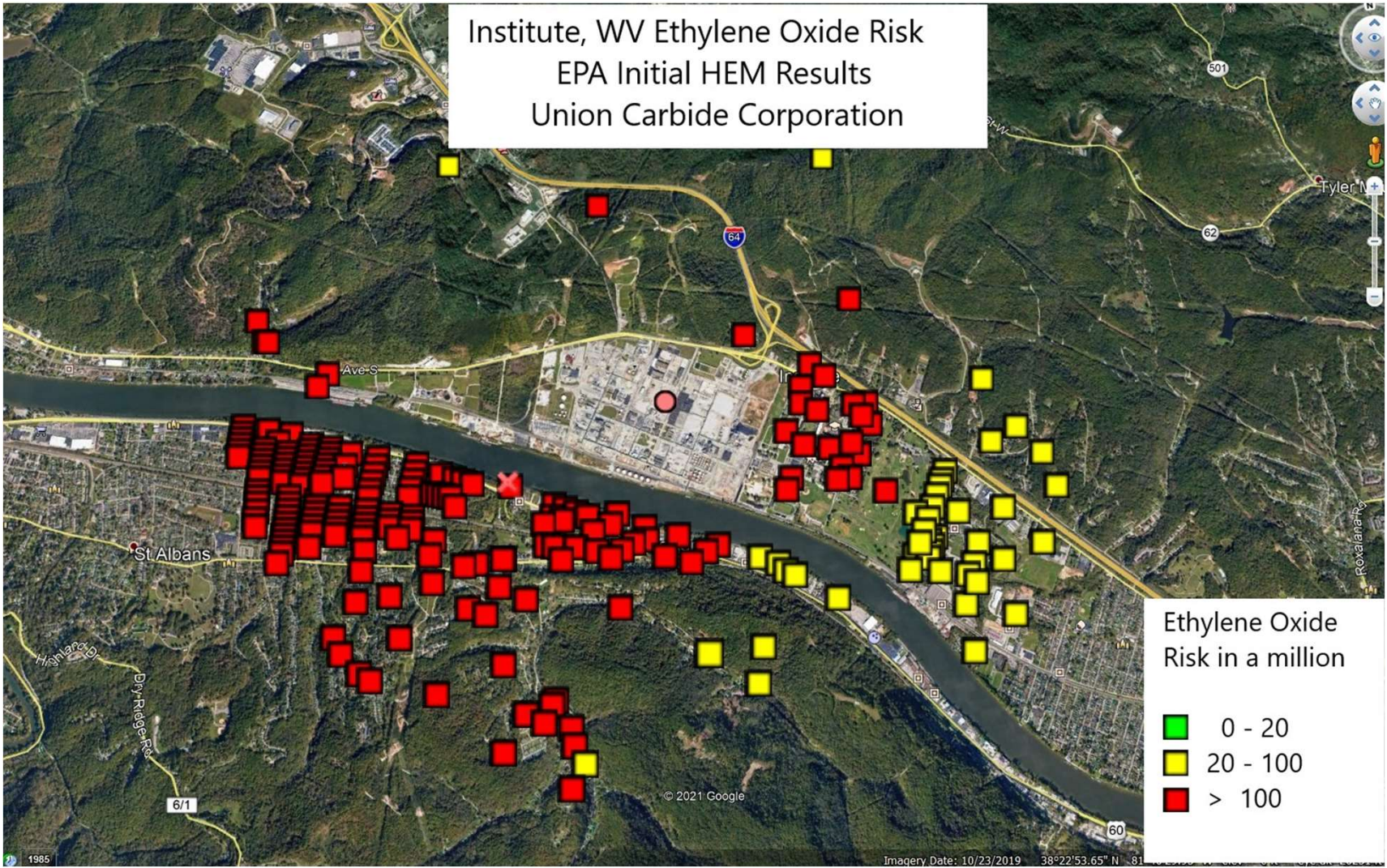
\*Only ethylene oxide emissions were modeled

Facility	2017 DAQ	HEM-3 Results	
	EtO Emissions (tpy)	Conc ( $\mu\text{g}/\text{m}^3$ )	EtO Cancer Risk (in a million)
Union Carbide Institute	0.811	0.0758	379
Union Carbide South Charleston	0.3549	0.1701	851
Covestro	0.0822	0.0369	185

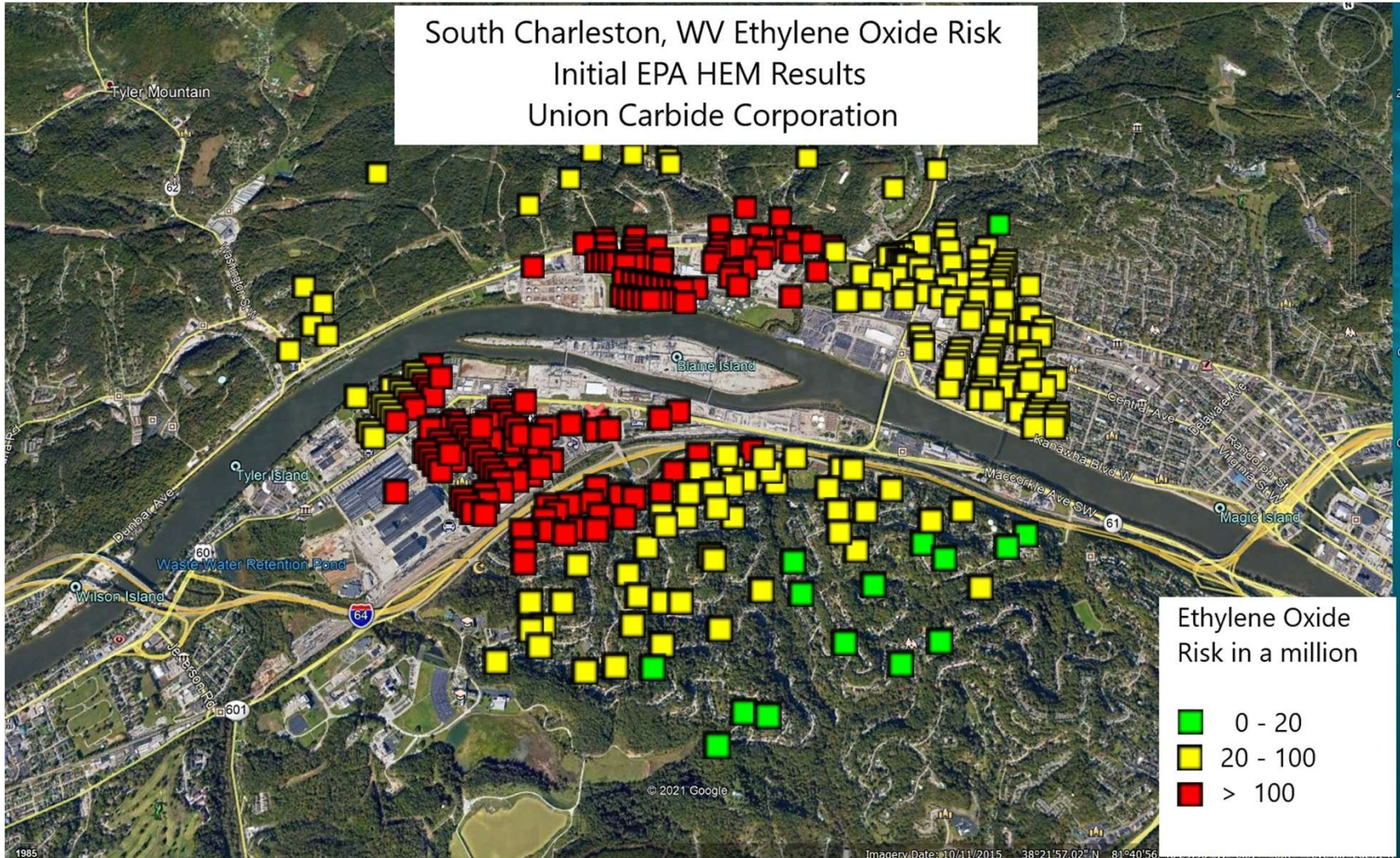
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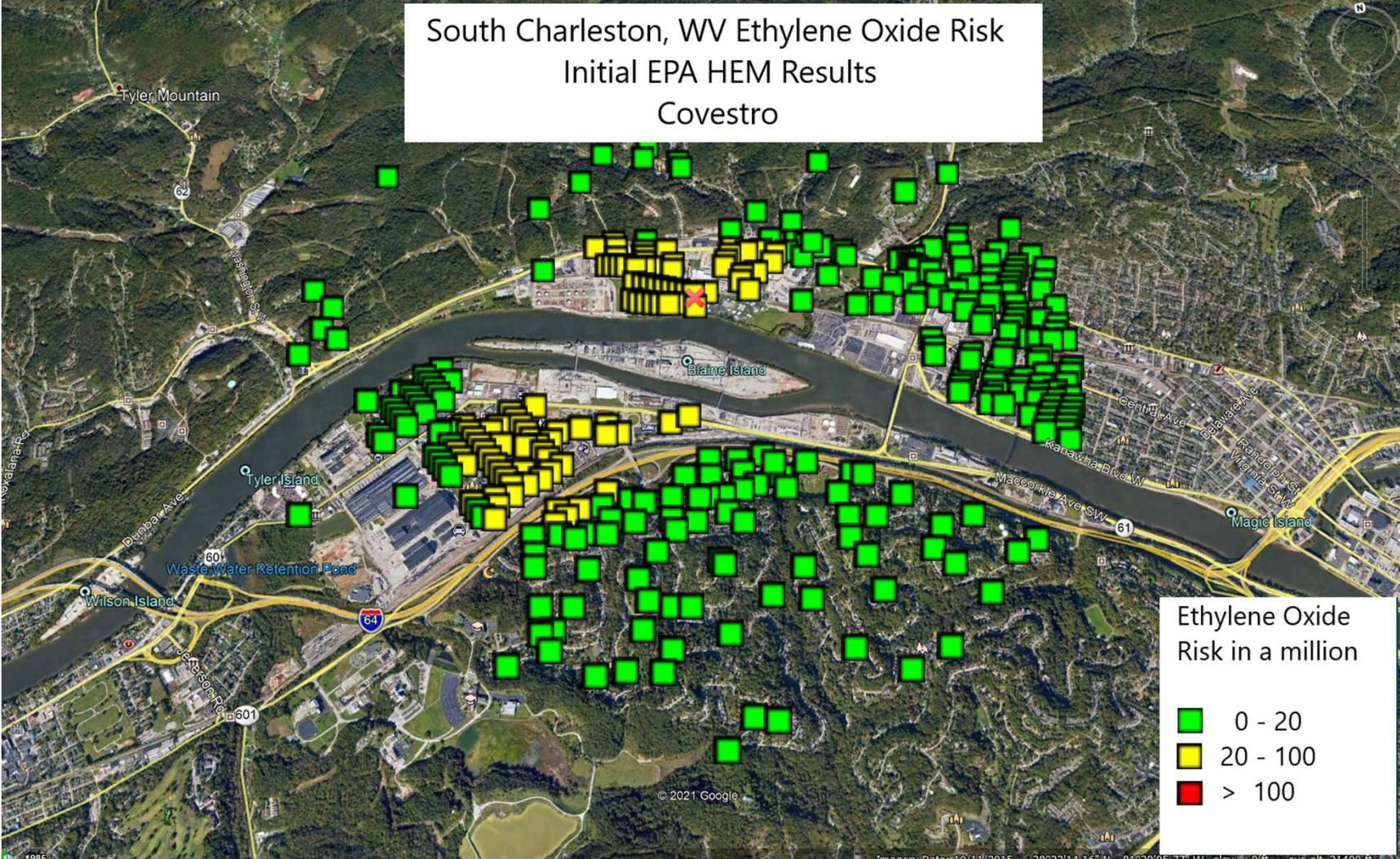
Institute, WV Ethylene Oxide Risk  
EPA Initial HEM Results  
Union Carbide Corporation



South Charleston, WV Ethylene Oxide Risk  
Initial EPA HEM Results  
Union Carbide Corporation



South Charleston, WV Ethylene Oxide Risk  
Initial EPA HEM Results  
Covestro

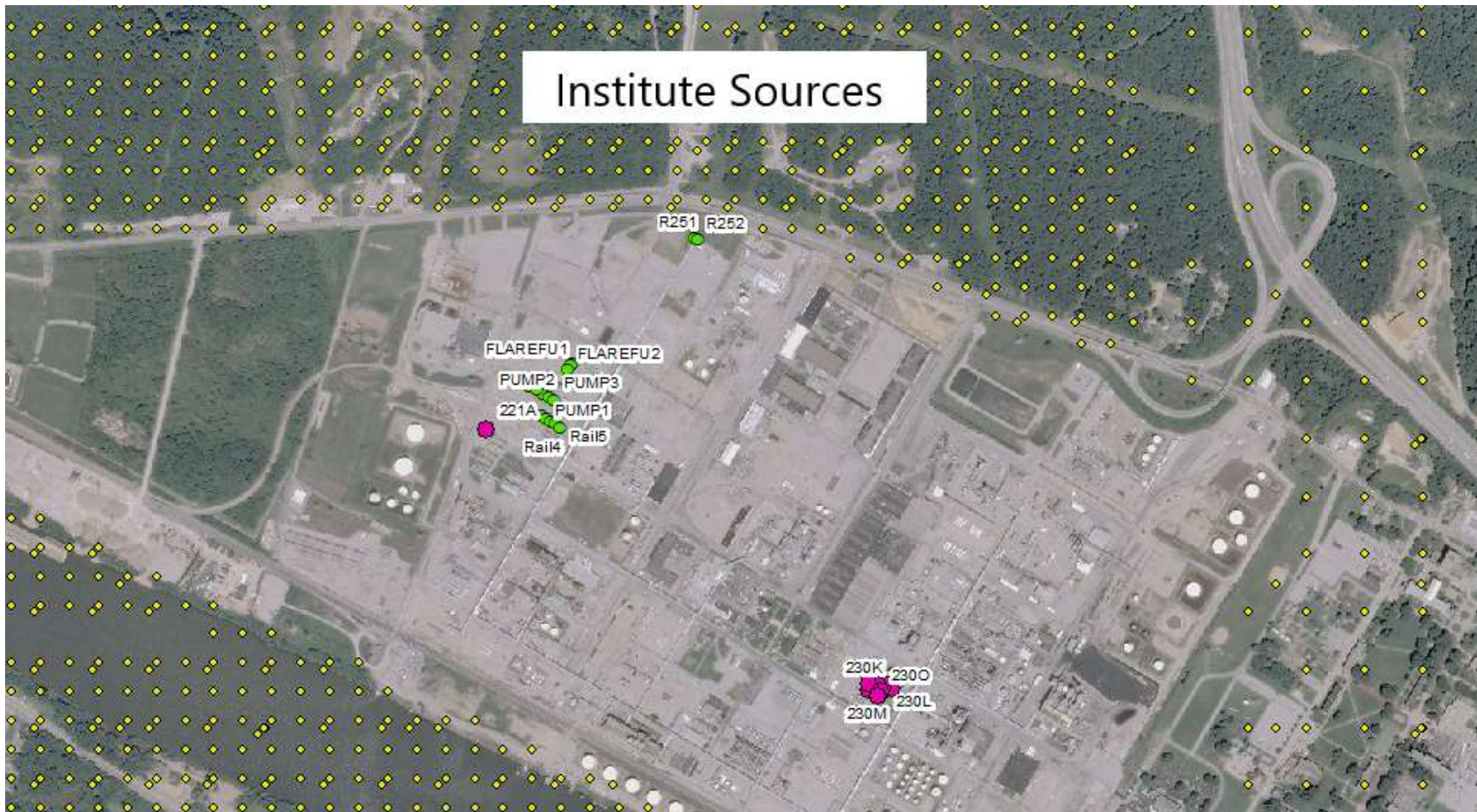




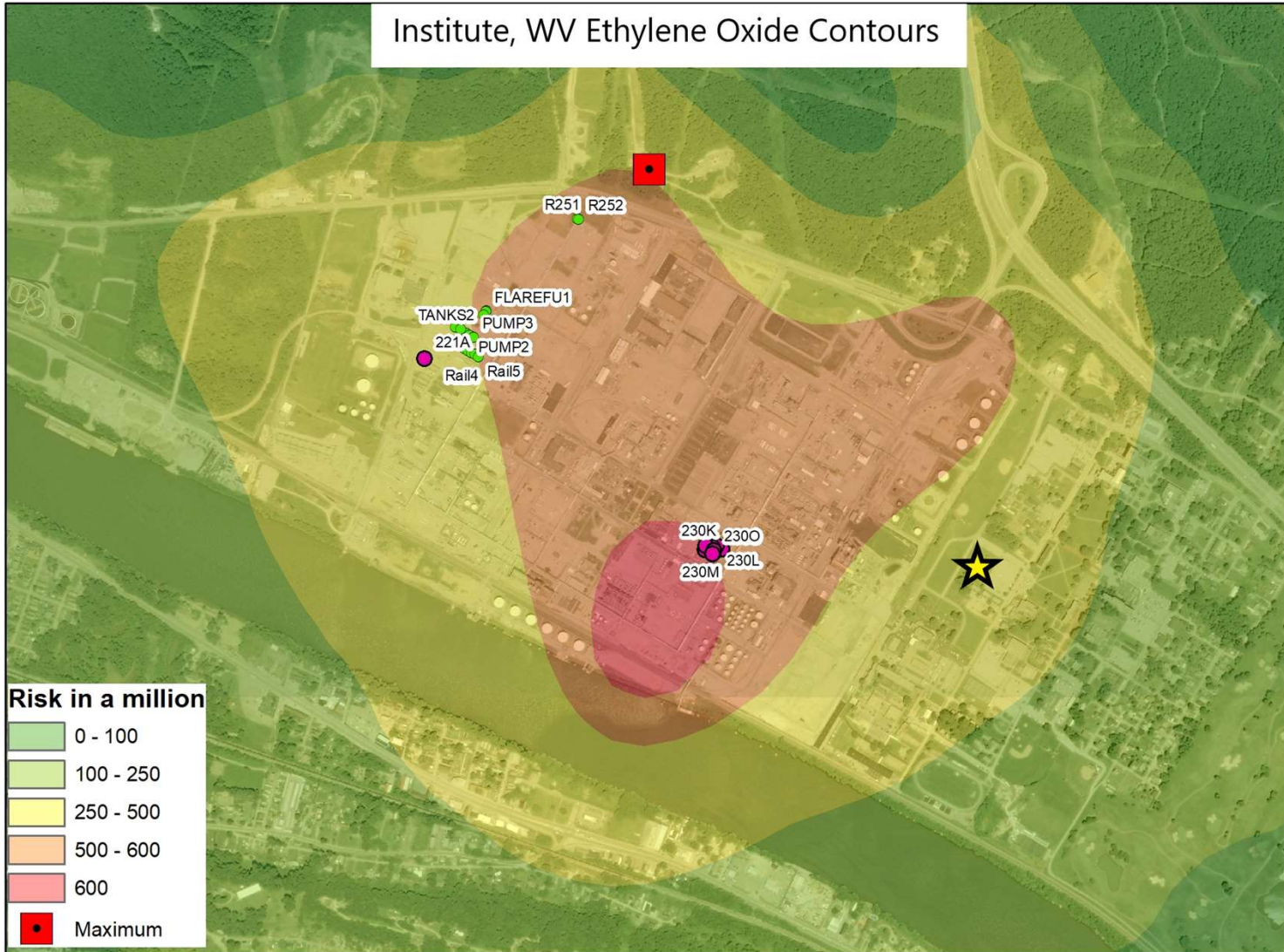
- In 2019 WV DAQ requested more specific point source and fugitive emission data as well as onsite meteorological data
- WV DEP went to the Institute and SC sites to meet with facility officials and to see and map out the EtO processes/pipelines/unloading
- WV DAQ revised the model based on the more accurate emissions data
  - The locations and quantities of risk changed as a result

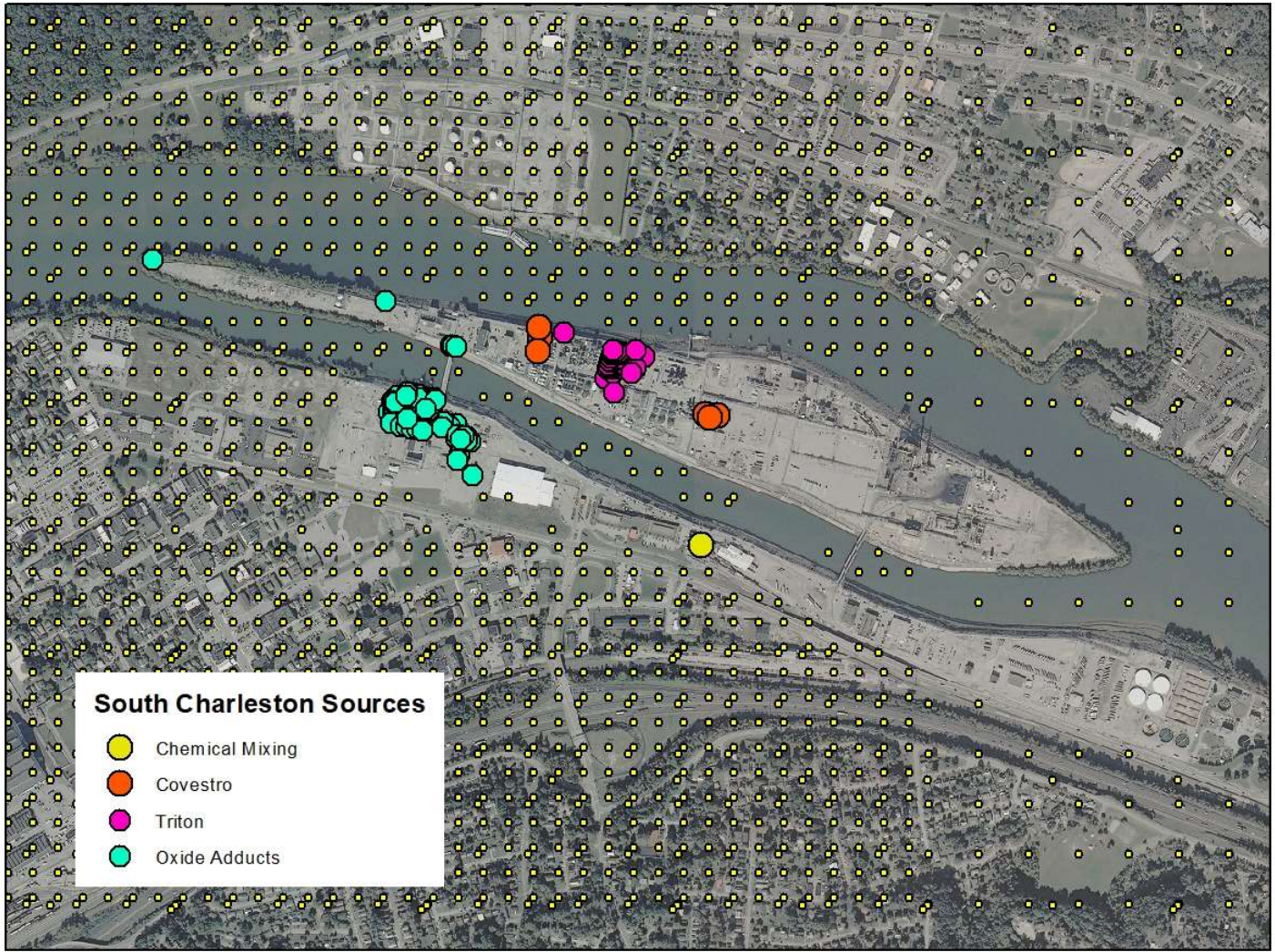
- The initial NATA model EPA provided to the public used meteorological data from Yeager Airport
- WV DAQ refined the model again using met data and detailed source characterization from the Institute and SC facilities

# Institute Sources

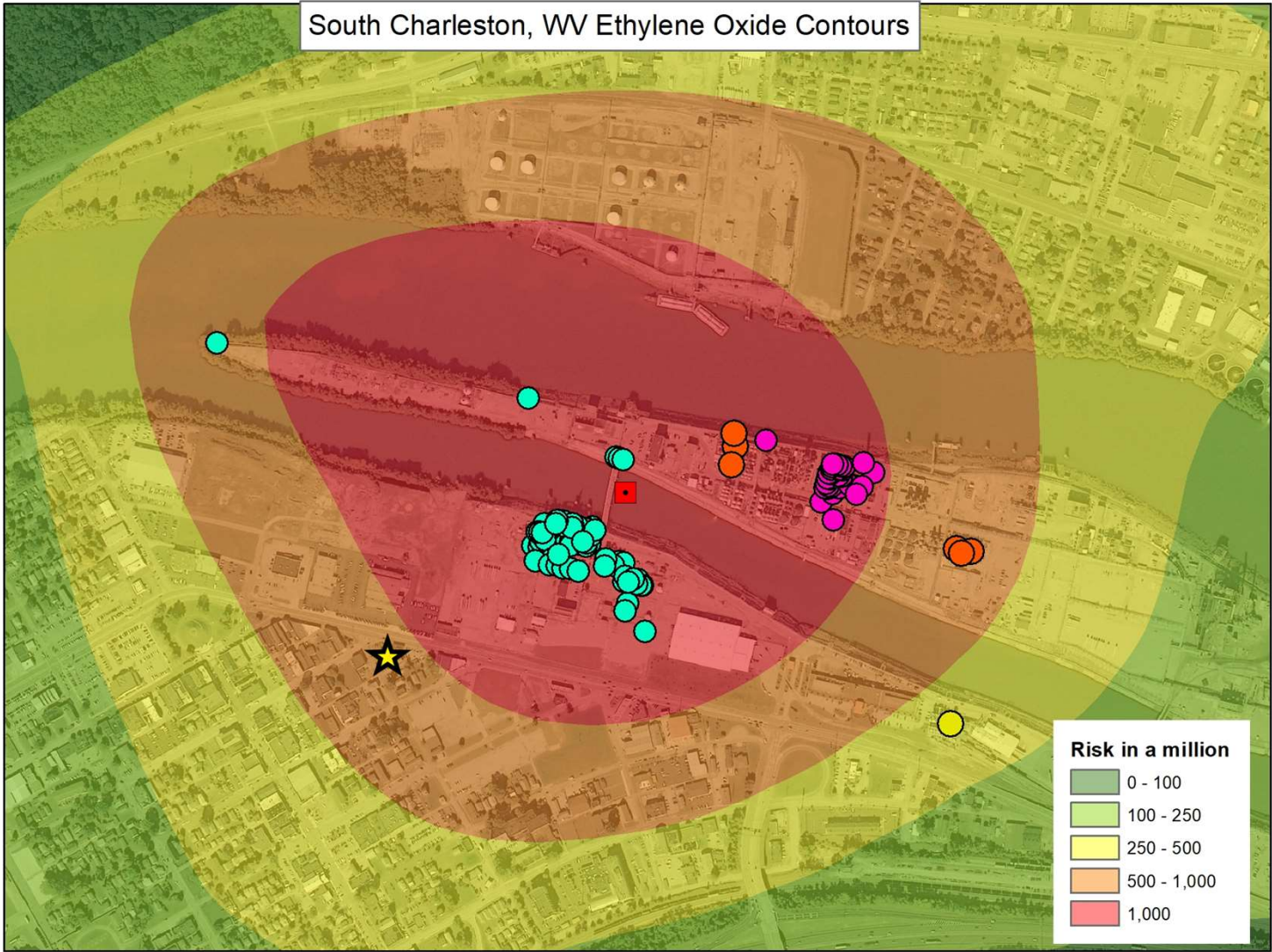


# Institute, WV Ethylene Oxide Contours





# South Charleston, WV Ethylene Oxide Contours



## EPA HEM-3 and DAQ/EPA HEM-3 Results For Ethylene Oxide

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# **Air Monitoring Proposal**

Renu Chakrabarty, Assistant Director, DAQ



# **Air Monitoring Proposal**

- Compare air monitoring data with air dispersion modeling results
- Site Access
- Monitoring Locations
- Monitoring Schedule/Logistics

# Summa Canister – TO-15, GC-MS analytical

- ERG – EPA’s National Contract Lab
- 0.0262 MDL (ppbv) EtO (~273/10<sup>6</sup> lifetime inhalation cancer risk)
- Participates in EPA’s Proficiency Testing Program
- Manual turn on/turn off
  - To mitigate possible timer valve leakage
  - 24 hr ±1 hr
- Ideally set at 5-6 ft height (breathing ht)



# EPA Review

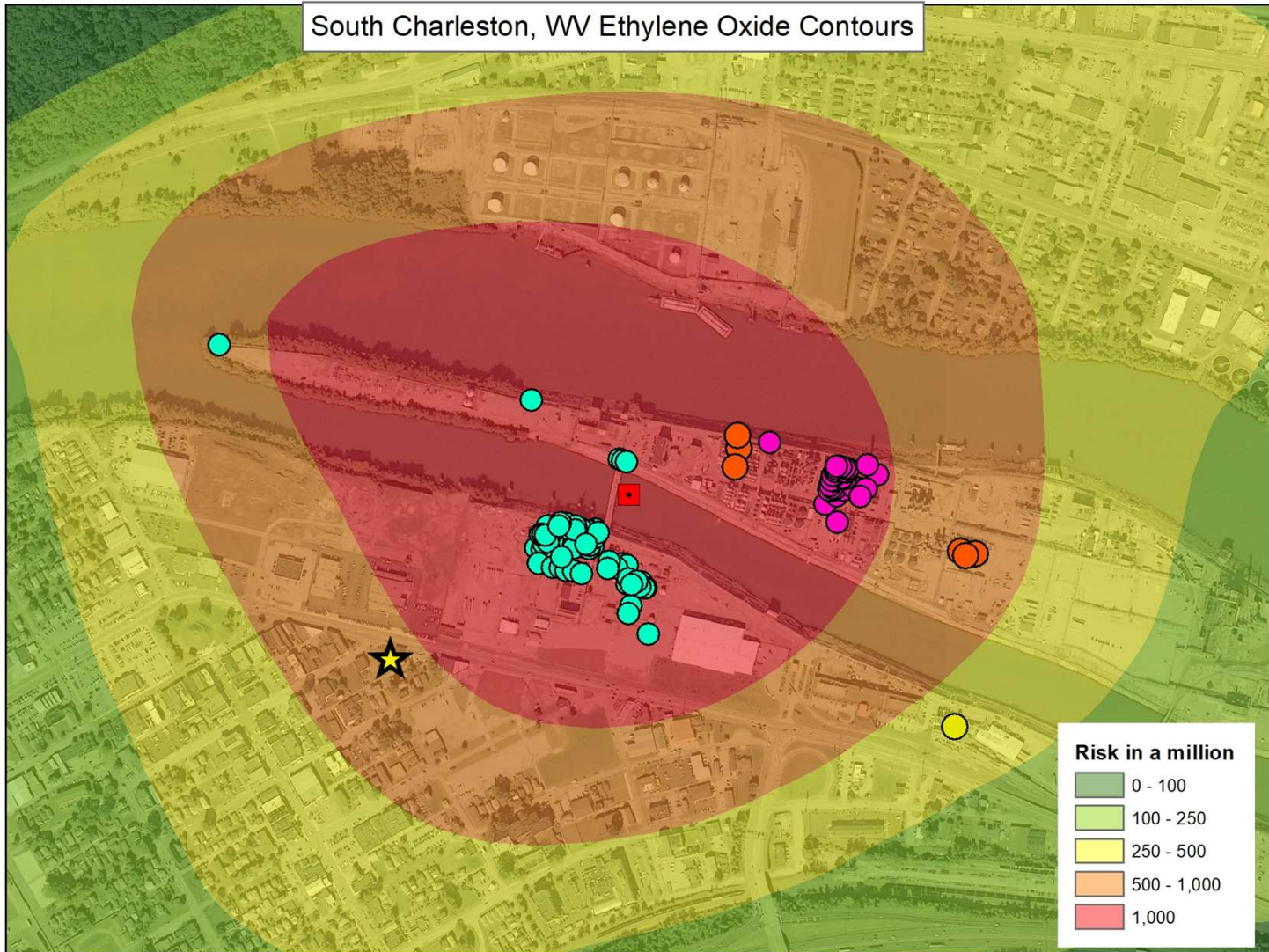
- QAPP – Quality Assurance Project Plan
- SOP – Standard Operating Procedure
- FSP – Field Sampling Plan
  - Specific sampling locations documented
  - Specific contacts – inc. Facilities for any access needs + process schedule, emissions, met

# Example Summa Canister Locations along fenceline

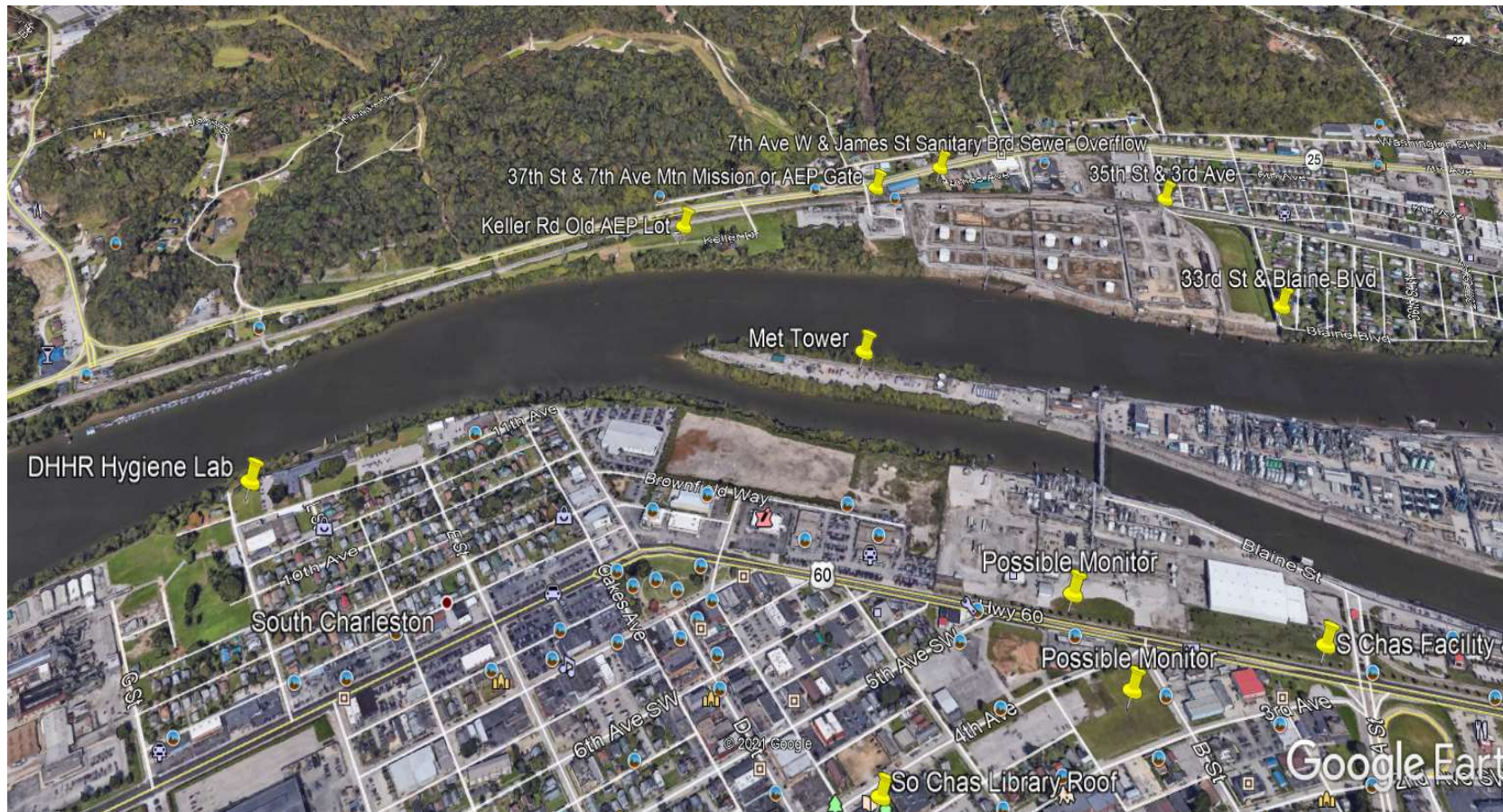


From MI DEQ EtO sampling, [Centurion Medical Sampling Report April 2021 \(michigan.gov\)](#)

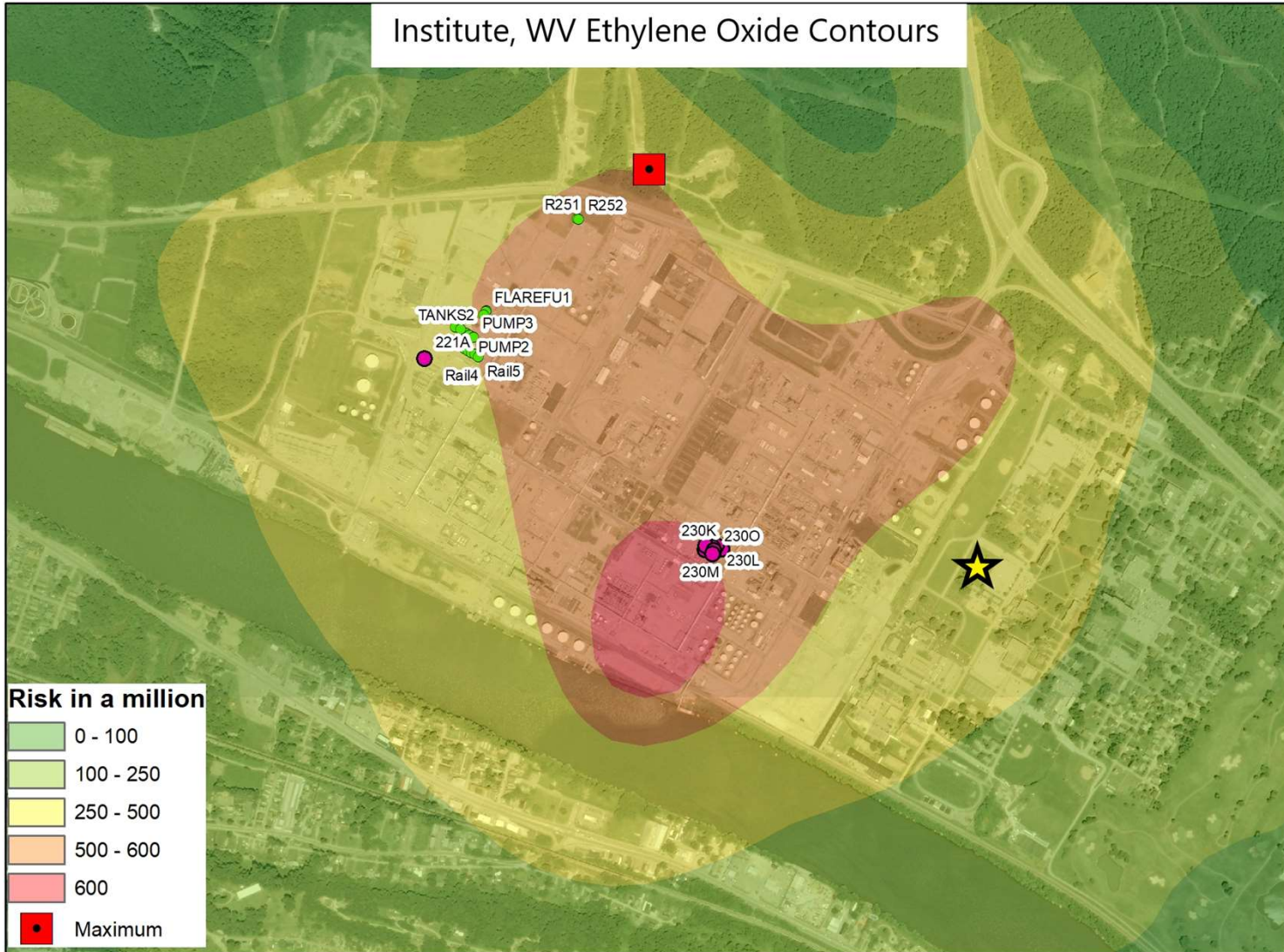
South Charleston, WV Ethylene Oxide Contours



# South Charleston - Possible EtO Sampling Sites



# Institute, WV Ethylene Oxide Contours



# Institute - Possible EtO Sampling Sites



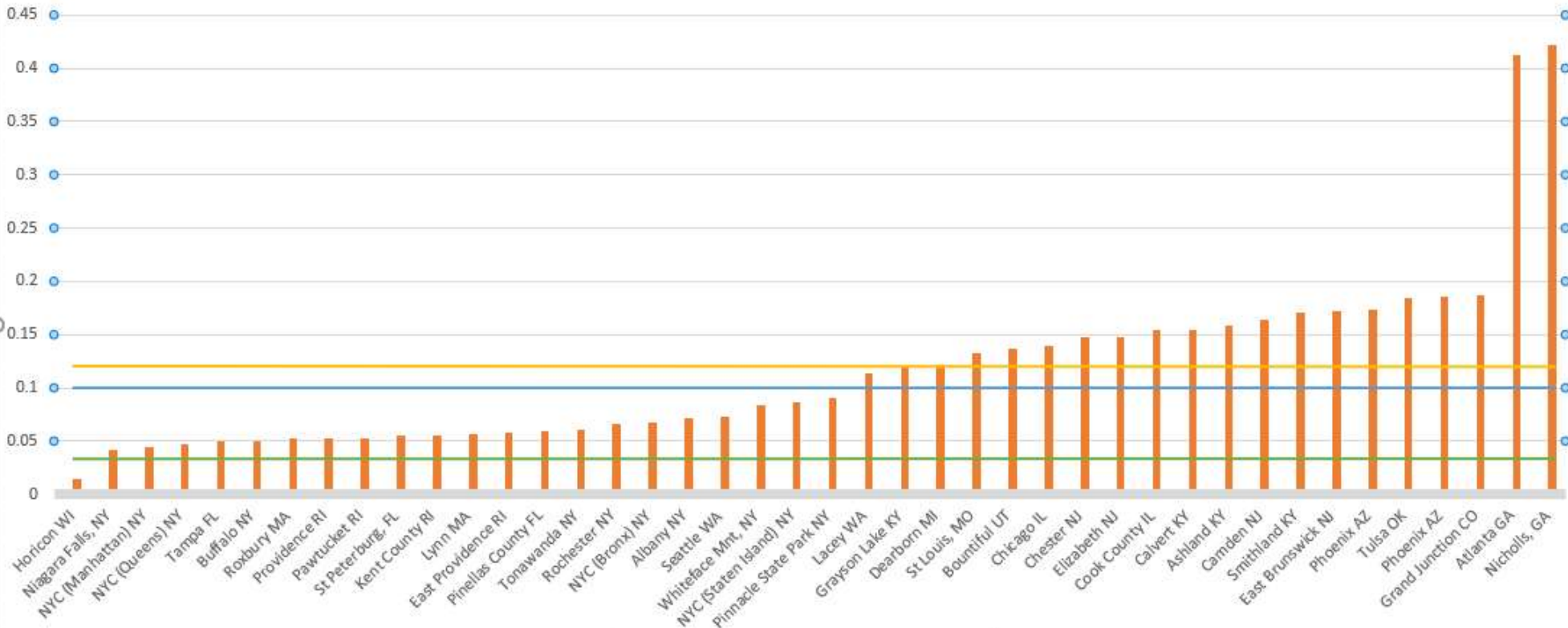


DRAFT June 3, 2021

### Phase 1 - Model Comparison

			Set 1	Set 2	Set 3	Set 4
Project Background - Guthrie			1	1	1	1
South Charleston						
Site						
A			1	1	1	1
B			1	1	1	1
C			1	1	1	1
QA				1		
Institute						
D			1	1	1	1
E			1	1	1	1
F			1	1	1	1
Blank					1	
		Sub-Total	7	8	8	7
		<b>Total =</b>				<b>30</b>

### National Air Toxics Trends Stations (NATTS) and non-NATTS Sites EtO Average Concentration (ppbv)

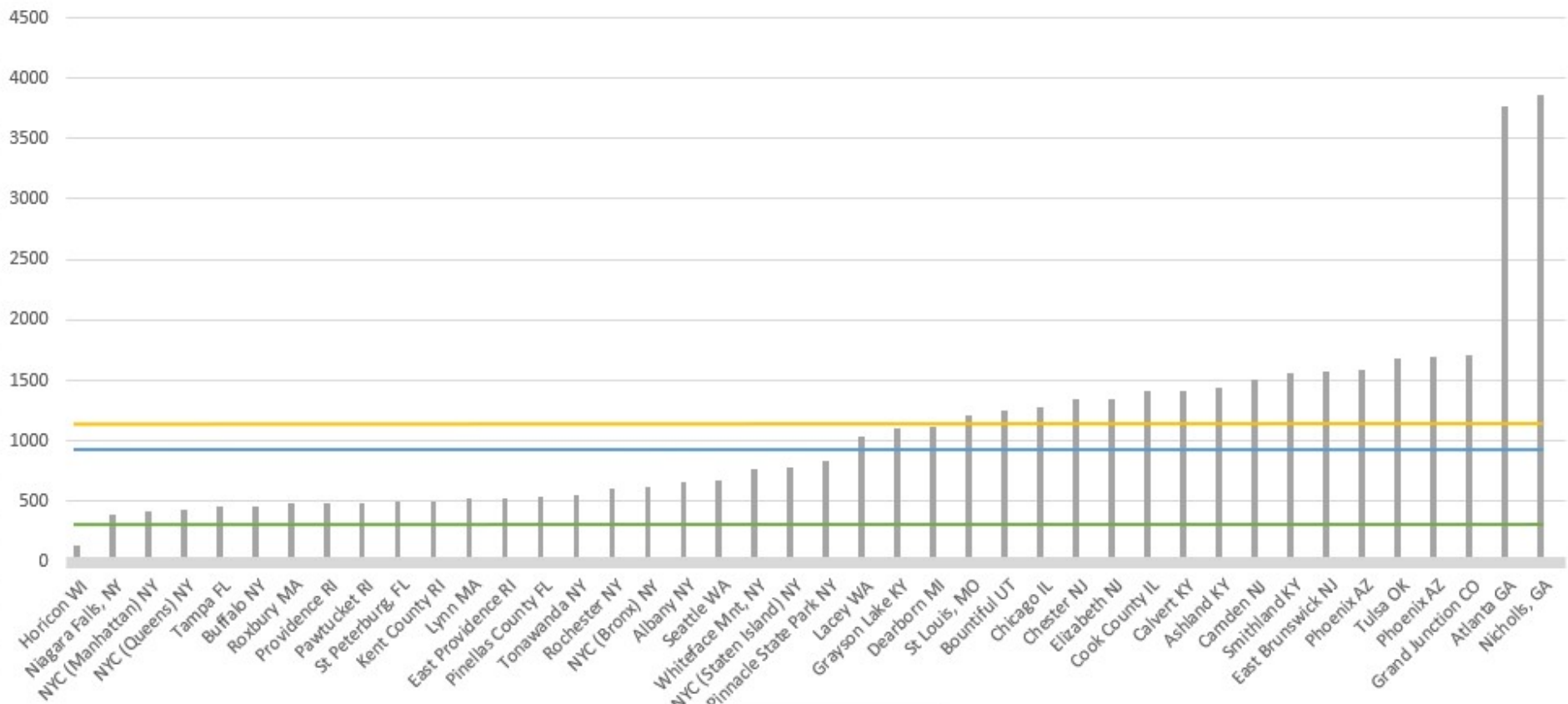


\*Number of samples for each site range from 4 to 259 (2018-2020)

— Average Concentration - 0.116 ppbv  
 — Highest MDL Concentration - 0.092 ppbv  
 — Lowest MDL Concentration - 0.022 ppbv

Draft - June 4, 2021

### National Air Toxics Trends Stations (NATTS) and non-NATTS EtO Site Average Risk (in a million)



\*Number of samples for each site range from 4 to 259 (2018-2020)

— Average Risk - 1,065  
 — Highest MDL Risk - 842  
 — Lowest MDL Risk - 201

Draft - June 4, 2021

# Monitoring to Modeling Comparison

- WVDEP plans to model actual emissions to compare with air monitoring data
  - Production Schedules
  - Ethylene Oxide Emissions Estimates
  - Meteorological Data

**Joint WVDEP & EPA Meeting(s)  
with the General Public**  
Laura Crowder, Director, DAQ

# Questions