

# State/Federal Government Coordination with Verona City Officials



## Agenda:

11:00-11:05	Introductions
11:05-11:10	Opening Dialogue
11:10-11:20	EtO Background & BCP voluntary stack testing (EPA)
11:20-11:30	Permits and air compliance (MDNR)
11:30-11:40	MDHSS cancer inquiry results (MDHSS)
11:40-11:55	EPA 112(r): Accidental Release Prevention / Risk Management Plan inspection, findings, and next steps (EPA)
11:55-12:00	Break
12:00-12:10	National Commercial Sterilizer EtO efforts and communications (EPA Region 7 / ARD)
12:10-12:25	EtO air monitoring project (EPA Region 7 / ORA-ARD)
12:25-12:40	Syntex Site Update: 5-Year Review, 1,4-Dioxane update (EPA Region 7 / SEMD)
12:40-12:55	OSHA inspection findings and next steps (OSHA)
12:55-1:10	Fall public availability session (All)
1:10-1:15	Closing remarks
1:15-1:30	Clean-up / depart



# Ethylene Oxide

<https://www.epa.gov/hazardous-air-pollutants-ethylene-oxide>

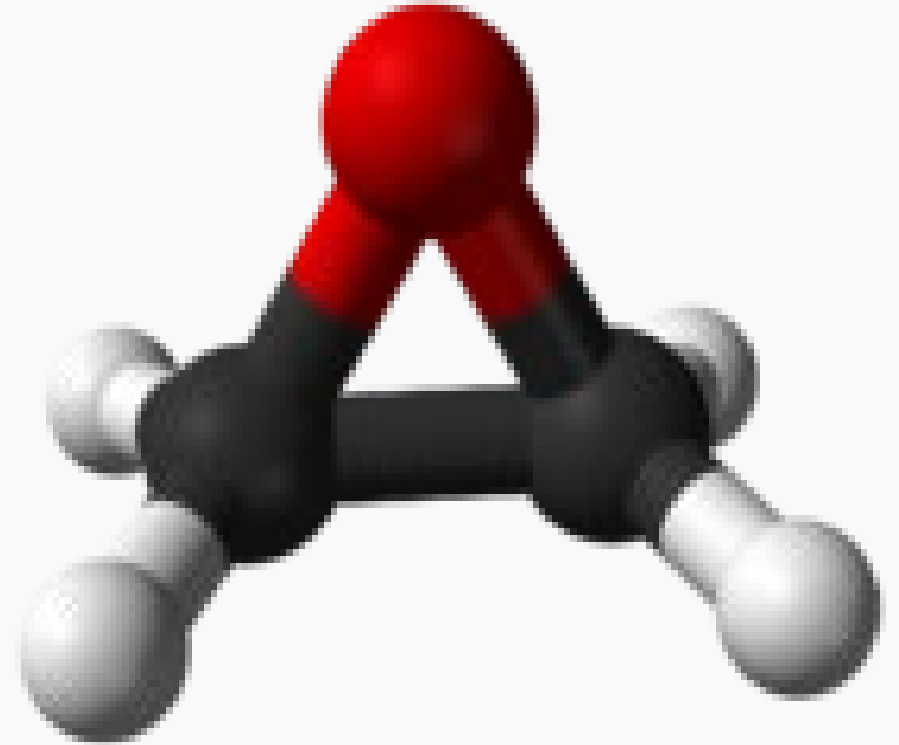
Dana Skelley & Amy Algoe-Eakin  
September 19, 2022

**U.S. Environmental Protection Agency, Region 7**  
*Iowa, Kansas, Missouri, Nebraska and Nine Tribal Nations*

# Background



- Ethylene Oxide is a gas at room temperature.
- Colorless and flammable gas with likely no odor outdoors.
- Ethylene oxide in the air can come from different types of sources, including industries such as chemical manufacturers and sterilizers.
- BCP has activities which relate to both these types of uses.
- In 2016, EPA determined EtO was more potent than previously understood.



# Background



Studies show that breathing air containing elevated ethylene oxide levels over many years increases the risk of some types of cancers, including cancers of the white blood cells (such as non-Hodgkin lymphoma, myeloma and lymphocytic leukemia); and breast cancer in females.

EPA is addressing ethylene oxide based on the results of the latest air toxic assessment which occurred in 2018 and an updated in 2022.

EPA air toxics assessment estimates **long-term risks** – those that may occur from breathing air containing elevated levels of air toxics continuously for many decades.

EPA air toxics assessment **does not estimate short-term** (acute) or intermediate risks.

# Background



BCP manufactures food, feed grade preservatives and repackages ethylene oxide for other users.

- Ethylene oxide is used BCP in their manufacturing process.
- Ethylene oxide is delivered by rail and unloaded and distributed to different activities at the plant.
- Ethylene oxide emissions occur at various locations on their property. The amount of emissions may vary depending upon BCP operations.
- Below are some examples of locations where emissions occur at BCP.
  - railcar unloading
  - chemical manufacturing-- includes all the various equipment, such as valves, pumps, and connectors
  - ethylene oxide repackaging building
  - wastewater treatment/lagoons



**December 2016**  
EPA conducts review of toxicity values for health effects resulting from chronic exposure to chemicals and revises risk of ethylene oxide.

2016

2018



**August 2018:**  
EPA releases air toxics assessment using revised ethylene oxide risk value

2019

**November 2018:**  
EPA R7 staff and MoDNR engage BCP to discuss EPA's air toxics analysis and BCP Ethylene Oxide emissions



**Leak and Detection Program (BCP)**

Program to characterize/fix equipment leaks.



**2019 Public Engagement**

- 1) meeting with public officials
- 2) public availability session at high school



2020



**2021 Public Availability Session**

2021



2022

**Fall 2022 Community Monitoring**

Deployment of EtO measurement in Verona projected to begin



**August-September 2022 Stack Test (BCP)**

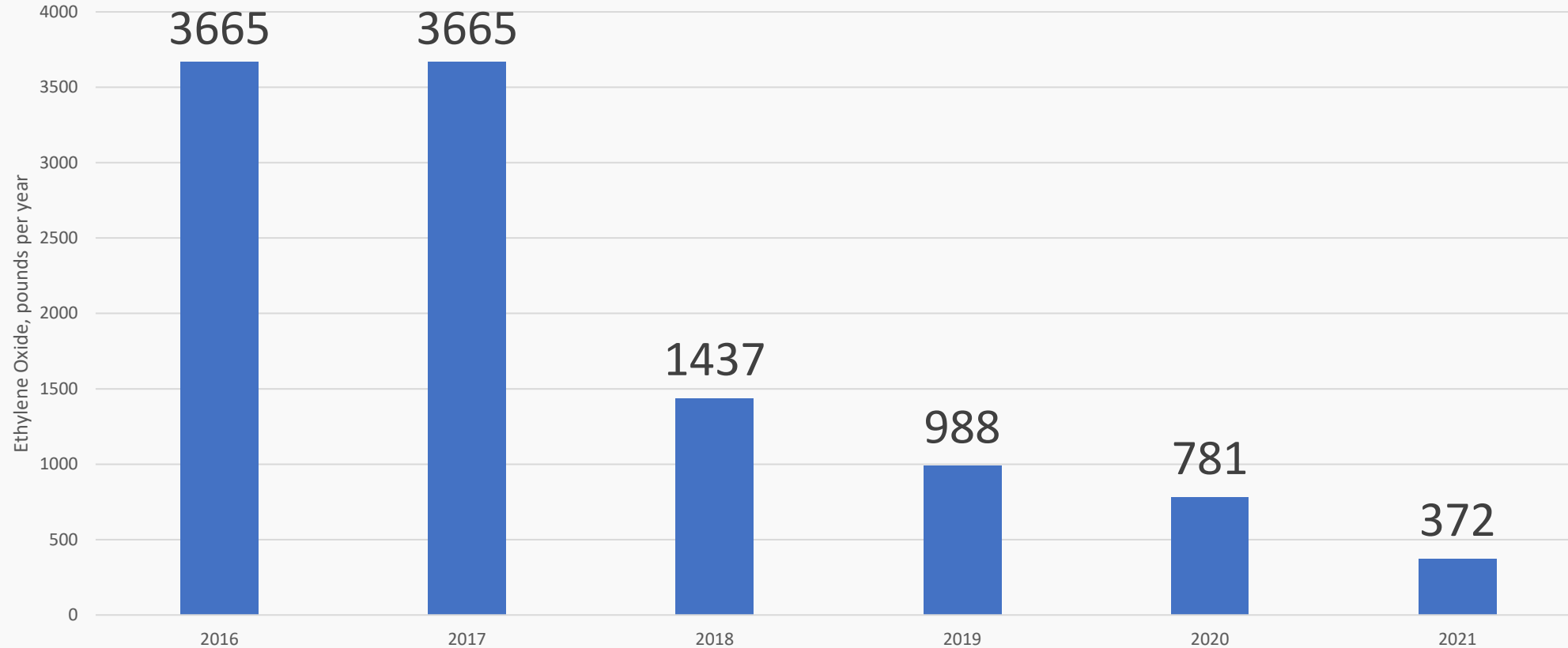
Planning, Pretest and Full Test conducted



# BCP Emissions



- Annual EO emissions reported by BCP to EPA's toxics release inventory:



Source: EPA Toxics Release Inventory

# Recap



Timeframe	Action
2016	EPA classified ethylene oxide as a human carcinogen.
2018	EPA conducted a national air toxics analysis, and Region 7 engaged BCP to investigate their ethylene oxide emissions.
2019-2021	BCP study, evaluate implemented emission reduction measures.
Since Dec 2021	Planning and Pretest for Stack testing. Stack test completed on 9/14/22 and awaiting report (approximately 30 days)  Planning for Community Monitoring ( anticipated deployment Fall 2022)

<https://www.epa.gov/hazardous-air-pollutants-ethylene-oxide>





# Questions/Discussion



# Verona Leaders Meeting

Stephen Hall

Director, Air Pollution Control Program  
State/Federal Government Coordination  
with Verona City Officials & Managers  
September 19, 2022

## Operating Permit

BCP operates under a Part 70 Operating Permit

- Permit identifies emission limits and compliance methods for air emission processes
- BCP is a minor source for ethylene oxide (BCP voluntary limited emissions)
- Permit is publicly available:  
<https://dnr.mo.gov/air/business-industry/permits/issued-pending>

# Recently Issued Construction Permit

The Air Pollution Control Program issued a construction permit to BCP on September 2, 2022

- Minor source permit to expand the choline chloride crystals operation
- The process does not emit ethylene oxide nor increase ethylene oxide from existing processes
- Permit establishes emissions limits for particulate matter and requires control devices (dust collector and wet scrubber)

Permits are publicly available:  
<https://dnr.mo.gov/air/business-industry/permits/issued-pending>

# BCP Verona Compliance

- In compliance with permitted emission limits
- Federally Reportable Violations (FRVs) of BCP's Part 70 Permit to Operate No. OP2019-025
  - October 2021 Semi-Annual Monitoring (SAM) report submitted 19 days beyond the due date of October 1<sup>st</sup> (resolved)
  - July 2022- Late Emissions Inventory Questionnaire fee payment (resolved)
- Other: April 8, 2022 ethylene oxide leak- To be reported on the SAM report due October 1, 2022 and on the Annual Compliance Certification

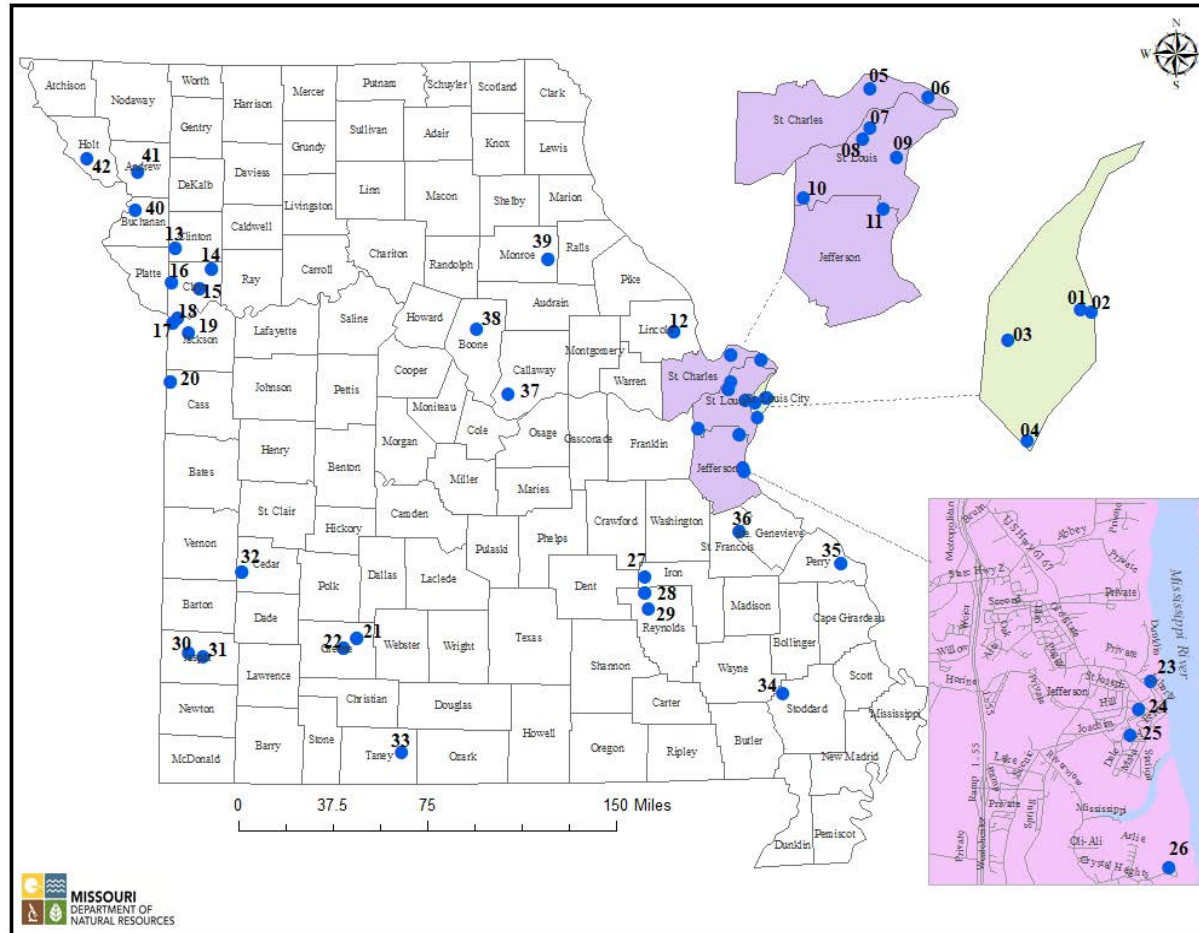
# Odor Concerns

- The Air Pollution Control Program regulates odors by rule 10 CSR 10-6.165, "Restriction of Emission of Odors"
- The Department's Southwest Regional Office team investigates odor complaints and refers violations to the Air Pollution Control Program
- The Air Program is working with ISONOVA TECHNOLOGIES LLC, 18184 Highway P, Verona, MO 65769 to address odor violations
- Abatement Order issued September 12, 2022 requiring 9 corrective actions of ISONOVA to mitigate odor violations

# Ambient Air Monitoring

- Designed to meet federal ambient air monitoring requirements for the Criteria Pollutants: lead, ozone, particulate matter, sulfur dioxide, carbon monoxide, and nitrogen dioxide
- Determine compliance with the National Ambient Air Quality Standards (NAAQS)
- Monitoring Network Plan: <https://dnr.mo.gov/document-search/2022-monitoring-network-plan>
- One Ambient Air Toxics Trends Station (NATTS) network measures long term trends in ambient air concentrations of hazardous air pollutants in large urban areas
- One NATTS site in St. Louis Missouri. State operated under an EPA grant. (Includes ethylene oxide, but the method detection limit is not adequate to resolve concentrations near the 100/million risk level.)

# Ambient Air Monitoring Network





# Blair St. Monitoring Station St. Louis



# Questions?

Stephen M. Hall

Director, Air Pollution Control Program

Missouri Department of Natural Resources

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Find us on the web at <https://dnr.mo.gov/air>

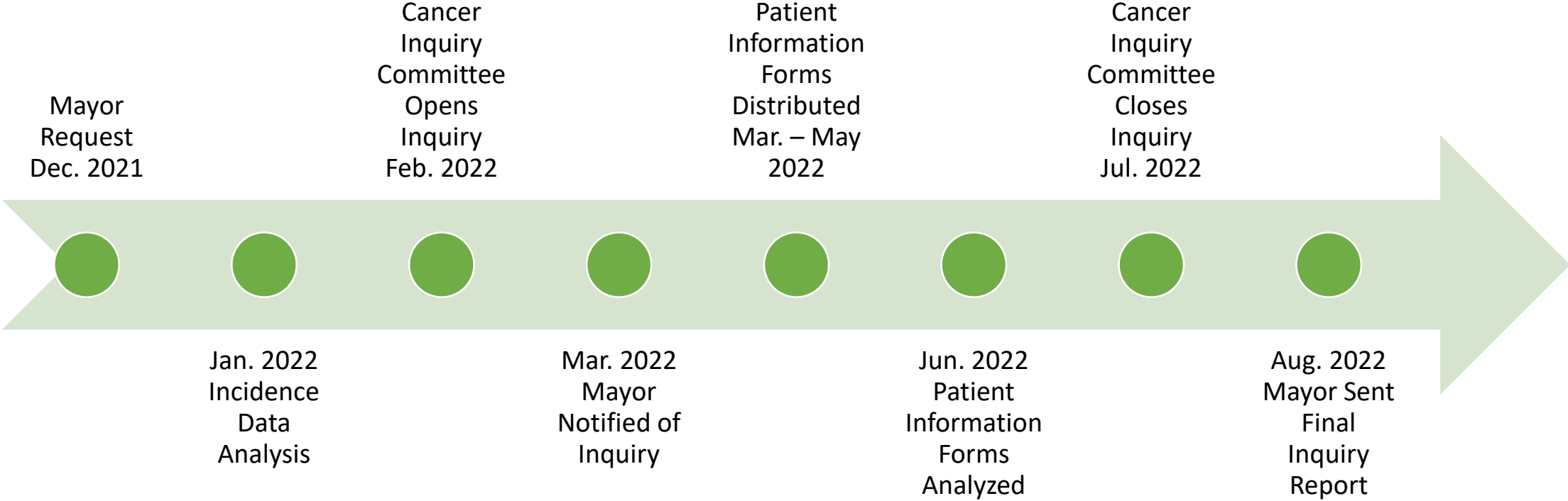
# Questions/Discussion



## Cancer Inquiry Results - Verona, Missouri

MISSOURI DEPARTMENT OF  
**HEALTH &**  
**SENIOR SERVICES**

# Timeline of Cancer Inquiry



# Incidence Data Analysis – Assessment

SSRW** (Site)	Observed counts	Source of reference rates							
		Remainder of Lawrence county				Remainder of state			
		Expected counts	SIR	SIR CI, lower bound	SIR CI, upper bound	Expected counts	SIR	SIR CI, lower bound	SIR CI, upper bound
Non-Hodgkin Lymphoma	17	7.4	2.29	1.33	3.67	8.4	2.03	1.18	3.25
Leukemia	8	5.7	1.39	0.60	2.74	5.9	1.36	0.59	2.69
Hodgkin Lymphoma	†	0.7	‡	<1.0‡	>1.0‡	1.0	‡	<1.0‡	>1.0‡
Female Breast	21	26.8	0.78	0.48	1.20	28.5	0.74	0.46	1.13
Stomach	†	3.1	‡	<1.0‡	>1.0‡	2.3	‡	<1.0‡	>1.0‡

Standardize Incidence Ratio (SIR) - The SIR is generally calculated to provide an estimate of the likelihood that an excess of cases exists in the population of concern (the study population) compared to the general or reference population. The SIR is a ratio of the number of observed cases to the number of expected cases.

# Age distribution of NHL cases, 1999-2018

<b>Average:</b>	<b>62.05882353</b>
<b>Min:</b>	<b>38</b>
<b>Q1</b>	<b>49</b>
<b>Q2 (Med)</b>	<b>64</b>
<b>Q3</b>	<b>73</b>
<b>Max:</b>	<b>89</b>

The Missouri Cancer Inquiry Committee voted to initiate a Level 1 cancer inquiry after reviewing the analysis of data.

Patient Information Forms (PIFs) distributed in the community

# Case Definition

- Resident in and around Verona at diagnosis
  - ZIP Code 65769 and within Lawrence county
- Diagnosed with non-Hodgkin lymphoma between 1999 to 2018
- Missouri Cancer Registry (MCR) confirmation
  - Non-Hodgkin Lymphoma

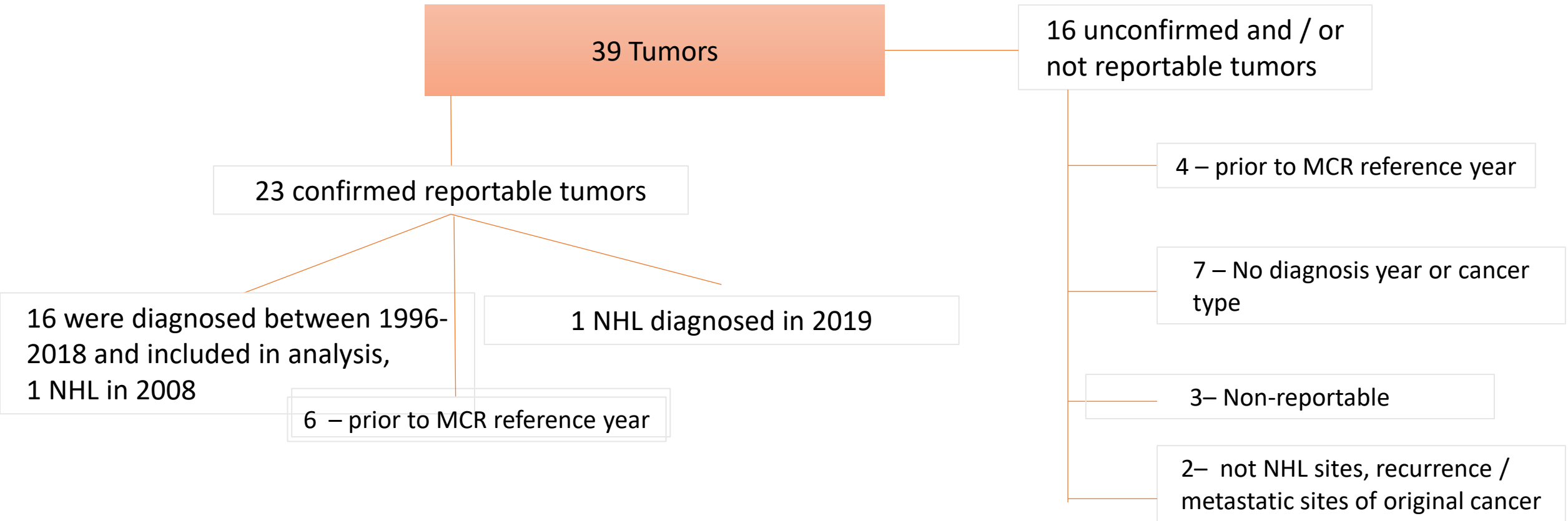


# Level 1 Cancer Inquiry: Patient Information Forms (PIFs), Mar- May 2022

Total tumors via PIFs:	39		
Directly given:			
Additionally listed:			
(note: only 24 PIFS, but 4 reported multiple tumors for the respondent to give a total of 28 directly responded tumors)			

- 24 PIFs received by DHSS
- 4 forms had multiple and/or metastatic or recurrence tumors
- Forms included names of 11 additional individuals who were also checked with the cancer registry database

# RESULTS



# Summary

- **Non-Hodgkin Lymphoma** has a statistically significantly higher number of cases than expected (compared to remainder of Lawrence: observed SIR is 2.29, compared to remainder of state: observed SIR is 2.03)
- **Leukemia** and **Hodgkin Lymphoma** did not differ statistically significantly from their expected counts (the 95% CIs of the SIRs contained 1.0)
- PIFs did not identify any additional tumors not included in the initial analysis
- Did not proceed to a Level 2 Inquiry –
  - Several different types of cancer among individuals submitting PIFs
  - Majority of the cases did not meet case definition
  - Relatively small number PIFs and confirmed cancer cases limiting analysis
  - Lack of information or ability on residents exposure to EtO over the years
- Final Report sent to Mayor in August 2022

Questions/Discussion



## Accidental Release Prevention / Risk Management Plan

- inspection,
- findings, and
- Next steps (EPA)

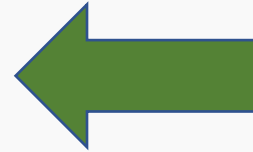


Questions / Discussion / Break

# Nationally: Commercial Sterilizers



Facility	IA	KS	MO	NE
<i>Sterilization</i>				
ACS	✓		✓	
Midwest Sterilization			✓	
BD Pharmaceuticals				✓
<b>Total Ster. Emissions</b>		0	407	2,037
<i>Chemical</i>				
BCP			✓	
Harcros		✓		
Ingredion	✓			
<b>Total Chem. Emissions</b>	2,094	3,436	372	0
<i>Total Emissions</i>				
<b>Total Emissions</b>	2,094	3,436	779	2,037
<u>Notes:</u>				
1. Total reported EtO emissions in pounds per year (2021).				



EPA will propose strengthening current regulations for Ethylene Oxide Commercial Sterilizers. EPA will consider risk as part of the proposed regulations. EPA is engaging communities with commercial sterilizers to provide background and information to them.

The Agency has also started work to review its rules for several additional chemical sector source categories, including Synthetic Organic Chemicals Manufacturing Industry, Polyether Polyols Production, and **Chemical Manufacturing Area Sources**. These are complex rulemakings, which can take several years to complete.



# Questions/Discussion





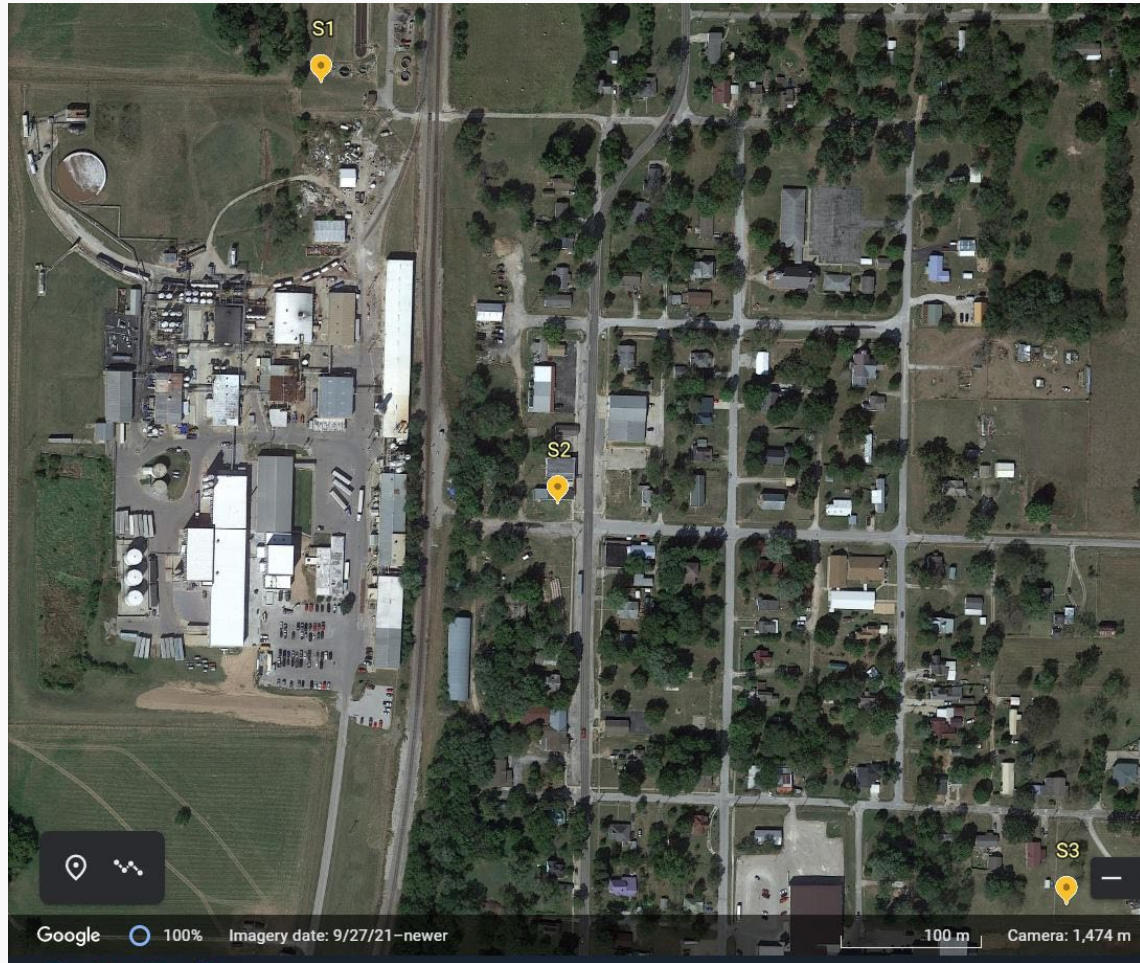
# Ethylene Oxide Monitoring

Alex Edwards & Mike Davis

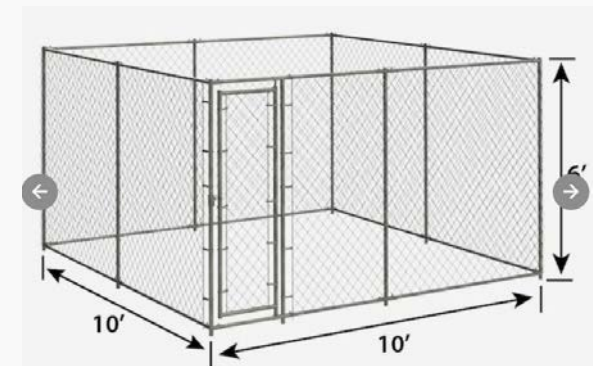
<https://www.epa.gov/hazardous-air-pollutants-ethylene-oxide/what-epa-doing-address-ethylene-oxide-and-learn-more-about>



# 24-Hour Canister Sampling



- 6L canisters
- 24-Hour Sampling
- Automatic Timers
- ~ 1 in 3 Day Interval
- Contract Lab Analysis
- EtO Analysis Only
  - (MDL <50pptv)
- Weekly Changeouts
- QC Samples
  - 1 Co-located Sample / week
    - Rotated between 3 sites
  - 1 Trip Blank / week
  - 1 Lab Intercomparison / week



# Mobile Air Sampling Research



- Time- Location Aligned Measurements every second
- AirMar200WX
  - GPS
  - Wind Speed/Direction
- Picarro G2920 Spectrometer
  - EtO (MDL <2.0 ppbv)
  - CH<sub>4</sub>
  - CO<sub>2</sub>
- GoalZero Yeti Power Supply
- Two-Person Operation
- Laptop Data Acquisition



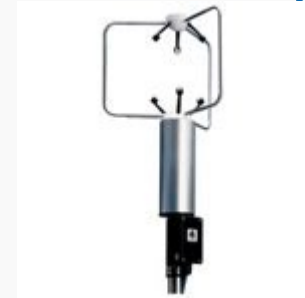
# Mobile Sampling Example Routes



# Vehicle Based Stationary Sampling



- Stationary Measurements based on observations
- Car Engine Off
- 3D Sonic Anemometer
- Picarro G2920 (MDL <2.0 ppbv)
- ~15 minutes
- Cannister Grab Sample Quality Assurance



# Meteorological Measurements-site 1



- Co-located 3D Sonics
- Continuous
- SPod
  - 2D Anemometer
  - Temp/Humidity
  - Real-time Telemetry
- Solar Powered
  - Battery Backup



# Questions/Discussion



# **Syntex Facility Superfund Site**

September 19, 2022

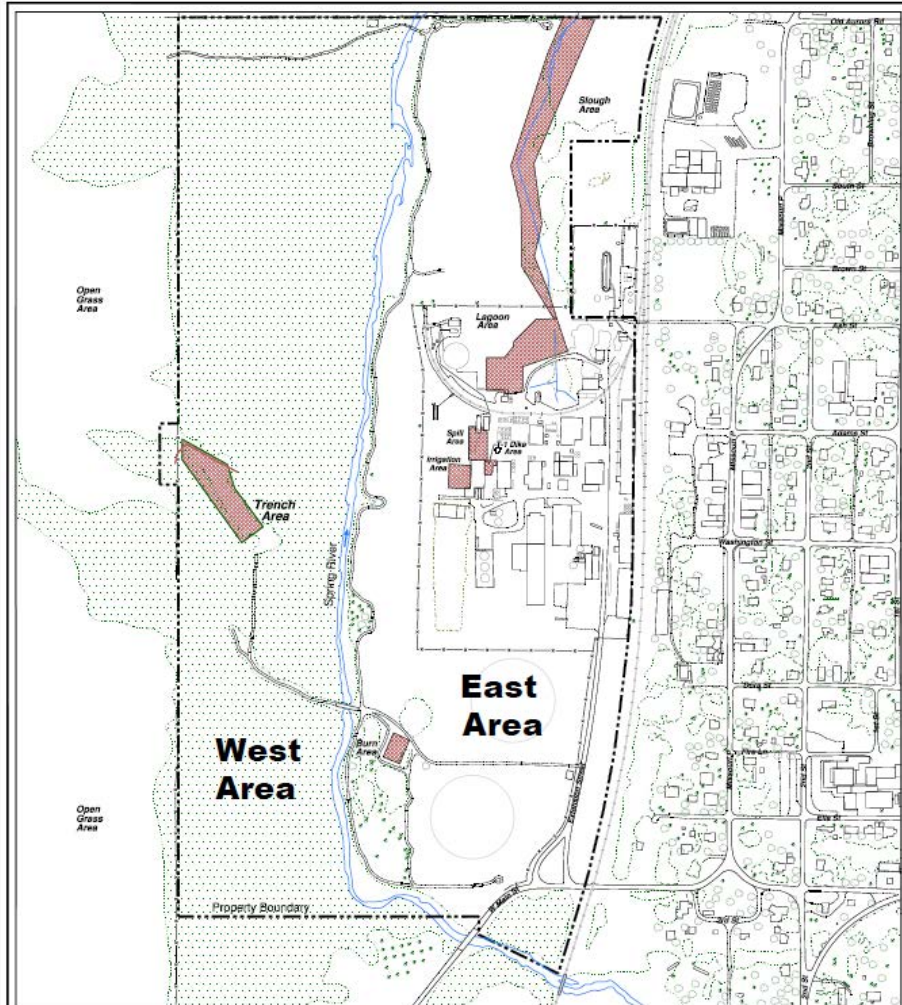
**Brian Zurbuchen, Ph.D., *RPM***

**U.S. Environmental Protection Agency, Region 7**

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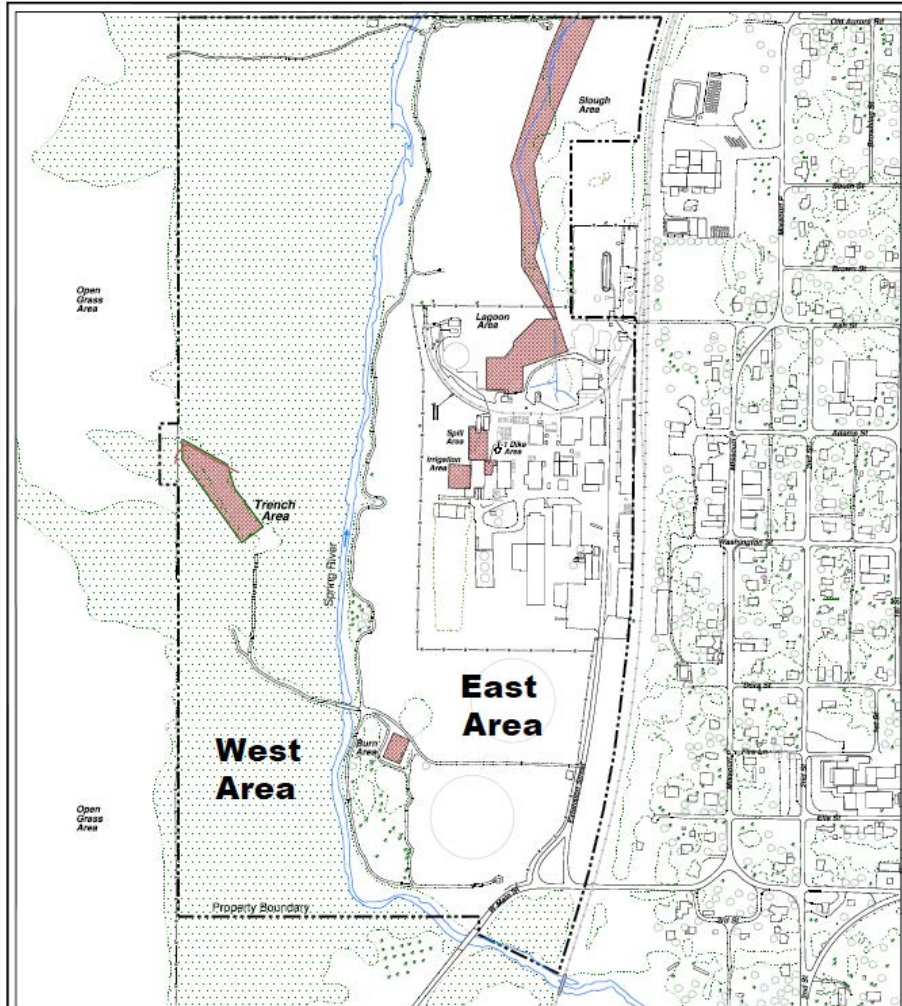


# Site Background



- 80 acres in uplands / 100 acres in 100-year floodplain
- 1960's Hoffman-Taff
- Dioxin contamination
  - 1968-1969 – Hoffman-Taff produces 2,4,5-T
  - 1970-1972 – NEPACCO produces hexachlorophene

# Site Background



- 1983 – Added to National Priorities List
- Operable Unit 1 – Soils and Equipment
  - Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin or TCDD)
  - 1988 Record of Decision –
    - excavate/incinerate dioxin-contaminated soils
  - Flood berm (added to remedy during design)
  - 1998 Remedial Action completed
- Operable Unit 2 – Groundwater
  - Several VOCs and metals present
  - 1993 ROD – No remedial action; 2 years of groundwater and surface water monitoring; human health risk assessment
- Orders – 1982, 1983, 1997, 2016

# Sixth Five-Year Review (Sept. 2022)



- **Five-Year Reviews**
  - Periodic evaluation of remedy protectiveness
  - Led/performed by EPA; includes team of EPA subject matter experts; reviewed by State
  - Includes data from Syntex investigations and assessments pursuant to 2016 Order
- Key Issues from 2012/2017 Five-Year Reviews have been resolved
- **Conclusions of the Sixth Five-Year Review**
  - Remedial actions were completed consistent with selected remedies.
  - Caps and/or vegetative covers are well-maintained.
- **Protectiveness Determinations (for the remedies)**
  - OU 1 Soils and Equipment – Short-term Protective
  - OU 2 Groundwater – Protective
- **Recommendations** - Reassess flood berm; Develop Operation and Maintenance Plan; Decommission monitoring well; Perform maintenance former of Lagoon Area cover

# Trench Area



- 1.3-acre area in West Area
- Manufacturing wastes dumped in 5 trenches 1966 – 1971
- Remedy selected in 1988 – cap, groundwater monitoring, risk assessment
- Remedy construction 1988-1990
- 2012 / 2017 Five-Year Reviews question protectiveness
- 2016 Order with Syntex – additional investigations/assessments
- Results – Trench Area remedy remains protective
- Land-use controls in place in April 2022

# 1,4-Dioxane



- Detected during recent site investigations
- Response to 1,4-dioxane detections
  - EPA requested information from BCP
  - EPA engaged with Syntex
    - Extend and expand groundwater sampling program;
    - Conduct high-resolution groundwater sampling and geotechnical investigation.
  - EPA engaged with community and sampled > 90 domestic wells.
  - EPA investigated BCP facility wastewater.
  - BCP conducted independent sampling of facility wastewater.
  - EPA evaluated BCP wastewater disposal practices. BCP's fertilizer exemption was a potential issue.
  - EPA notified BCP of potential liability in GNL Sept. 2020.
  - EPA negotiating Order with BCP and Syntex.
- Operable Unit 3 – Source Area Soils and Groundwater - 1,4-dioxane

# Questions?





OSHA inspection findings and next steps

# Future engagement



- Fall public availability session
  - Key considerations.
    - Format/Delivery
    - Timing
    - Presentations
    - Messages



# Wrap up

