



# Workshop L

## Industrial Odors in the Age of Environmental Justice

Jarod Gregory (Trinity Consultants)

Chris Kahn (Frost Brown Todd)

Sarah Keyes (ITW Evercoat)

The logo for ITW Evercoat, featuring the letters 'ITW' in a stylized, italicized font with red and white stripes, followed by the word 'Evercoat' in a bold, black, sans-serif font.

The logo for Frost Brown Todd, featuring the words 'Frost Brown Todd' in a serif font, with 'ATTORNEYS' in a smaller, all-caps font below it. A small blue square is positioned to the left of the word 'Frost'.

The logo for Trinity Consultants, featuring the words 'Trinity Consultants' in a sans-serif font, with a stylized blue and green graphic to the right. Below the logo is the website address 'trinityconsultants.com'.

## Presenters

### Jarod Gregory – Trinity Consultants

Senior Consultant

#### Odor Experience:

Direct sampling, monitoring, modeling, training, air permitting, odor mitigation plans, field studies

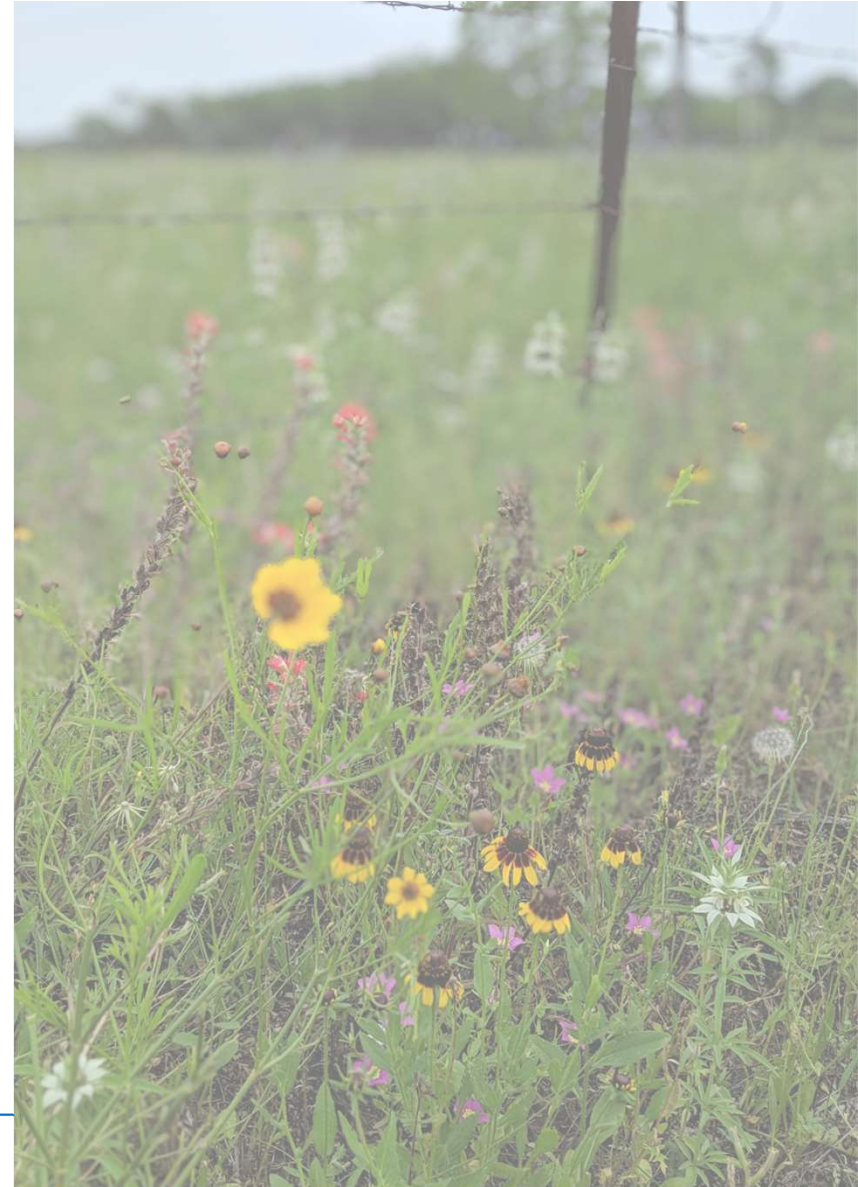
### Chris Kim Kahn – Frost Brown Todd

Member, Environmental Practice Group – Frost Brown Todd

### Sarah Keyes – ITW Evercoat

Technical & Regulatory Information Manager

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## Presentation Agenda

1. The basics of industrial odors
2. How odor is regulated and the potential legal implications
3. The methodologies for measuring and minimizing impact from industrial odors
4. Strategies for common sense community engagement

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# Fundamentals of Odor





## Why Do We Care About Odor?

### ► Odor is everywhere

- Common environmental nuisance
- Common complaint to regulators and governing bodies
- Impacts can be acute and immediately noticeable
- Encroachment: the boundaries between community and industry are shrinking

### ► Odor regulation is minimal

- US EPA does not regulate odor; Environment Canada considers odour a contaminant
- Typically addressed loosely through nuisance regulation at a state/provincial level
- Some states/provinces have numerical odor standards
- Some cities/municipalities have odor standards

### ► Odor is not well understood

- Knowledge of regulators is poor due to lack of prescriptive rules and protocols for measuring/defining odor
- Regulators often look to industry and consultants to take charge in dealing with odor, i.e., “show us an action plan and timelines”

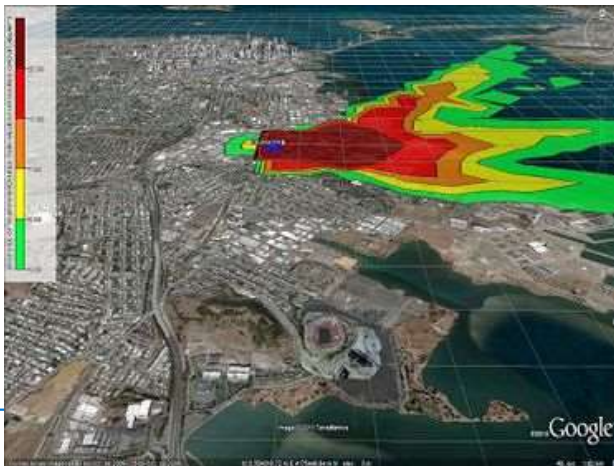
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## Odor Complaints

- ▶ Odor is a perceived problem that is highly subjective by nature, and the impacts of odor are acute and immediately noticeable (unlike criteria pollutants or even HAP/TAP, for example)
- ▶ It can be a complex task to quantify and measure odor
- ▶ Community odors are one of the **top three** complaints to air quality regulators and governing bodies in North America
- ▶ Public complaints are based on a wide variety of factors:



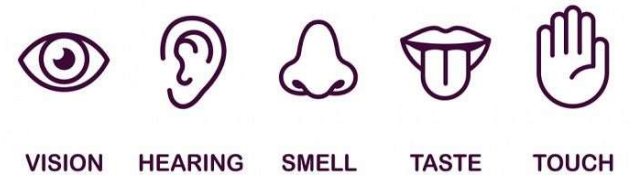
- Character of the odor
- Frequency of the odor
- Weather conditions
- Strength and persistence of the odor

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# What is Odor?



► **Smell** is one of our five senses. **Odor** is...



- “The perception experienced when one or more chemical substances in the air come in contact with the various human sensory systems”
- “Sensations that occur when chemical substances (called odorants) stimulate receptors in the nasal cavity”
- Odor is a human perception which creates inherent challenges

## Defining Odor

- ▶ Sense of smell is the most complex and unique in structure of all the five senses
- ▶ Olfaction provides 80% of all flavor sensations
- ▶ Olfactory system plays a major role in the body's natural defense system
- ▶ Odor is defined as:
  1. A quality of something that stimulates the olfactory organ
  2. A sensation resulting from adequate stimulation of the olfactory organ



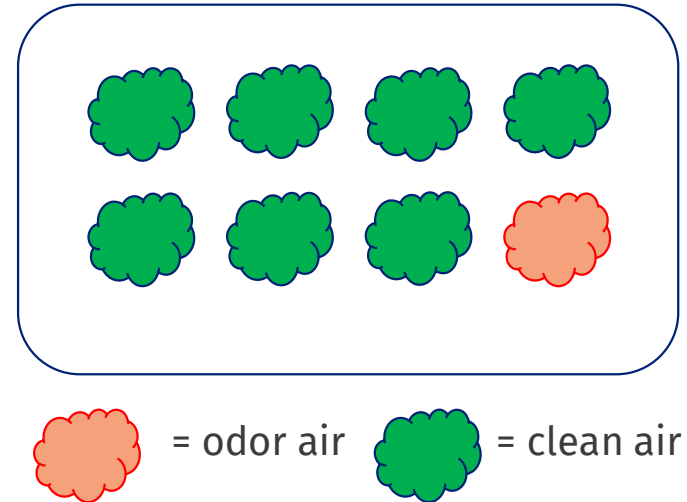
## Terminology – Odor vs Odorant

Odor =  
Perception

Odorant =  
Chemistry

## Understanding Odor Units

- ▶ 1 Odor Unit (OU) is defined as:
  - The odor concentration at which 50% of a population can begin to sense an odor or begin to recognize an odor
- ▶ The **Detection Threshold** is the point at which an odor is sensed
  - Generally used for compliance
- ▶ The **Recognition Threshold** is the point at which an odor is recognized



# Odor Characterization

- ▶ Five basic properties, identifiable by human detection – “FIDOL” principles
  - *Frequency* – how often the odor impacts occur
  - *Intensity* – the relative odor strength (faint to overwhelming)
  - *Duration* – the length of time for a given odor event
  - *Offensiveness* – the character or description of the odor (also referred to as “hedonic characteristic”)
  - *Location* – mapping impact and identifying other off-property contributing sources

# Indicative Analysis

Chemical	Descriptor
Hydrogen Sulfide (H <sub>2</sub> S)	Rotten Eggs
Methyl Mercaptan (CH <sub>3</sub> SH)	Bad Breath
Ethyl Mercaptan (EtSH)	Cabbage/Onions
Dimethyl Sulfide (CH <sub>3</sub> - <sub>2</sub> S)	Cabbage
Acetic Acid (CH <sub>3</sub> CO <sub>2</sub> H)	Vinegar
Triethylamine (Et <sub>3</sub> N)	Fishy

# Indicative Analysis: Sulfur compounds

- ▶ “Odor Emission Rates from Digested Sludges” – M.J. Carsen, T. Anderson

**Table 4.** Threshold odour concentration, detection limit and corresponding odour concentration for key sulphur gases

gas	Threshold odour concentration	Detection limit used in lab trial	Corresponding odour concentration <sup>a</sup>
H <sub>2</sub> S	0.5 ppb	50 ppb	100 OU/m <sup>3</sup>
Ethyl mercaptan	0.2 ppb	50 ppb/ 5 ppb total mercaptans	250 OU/ 25 OU/m <sup>3</sup>
Methyl mercaptan	1.1 ppb	50 ppb/ 5 ppb total mercaptans	45 OU/ 5 OU/m <sup>3</sup>
Dimethyl sulphide	1 ppb	50 ppb	50 OU/m <sup>3</sup>

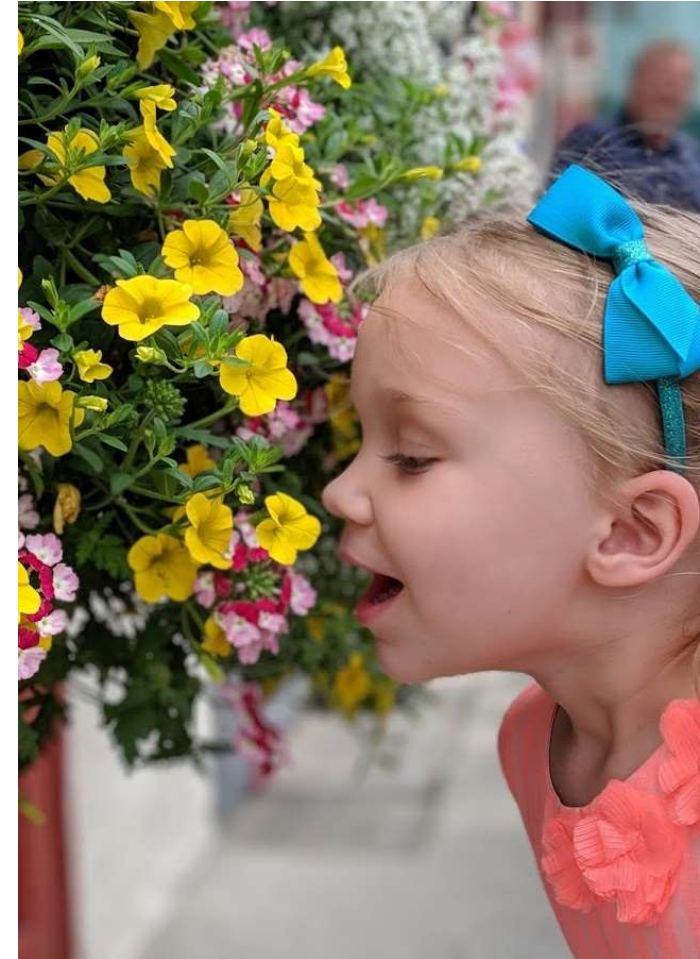
<sup>a</sup> Calculated by dividing the detection limit concentration of the odorous substance by its threshold odour concentration (which is equivalent to 1OU/m<sup>3</sup>)

## Unique Properties of Odor

- ▶ Unlike most regulated contaminants, odor does not necessarily have additive release effects
  - If two distinctly different odors are released from your site, they may not contribute to each other's overall off-site effect
- ▶ Unlike dust: every new emission point tends to increase maximum off-site concentration
- ▶ Unlike noise: where  $80 \text{ dBA} + 80 \text{ dBA} = 83 \text{ dBA}$

## Complications with Odor Detection

- ▶ Over exposure increases overall sensitivity to odor
- ▶ Subjective by nature (but we work to make it more objective with quality measures and best practices)
- ▶ Nose is “limited” instrument
  - Adaptation
  - Desensitization
  - Fatigue





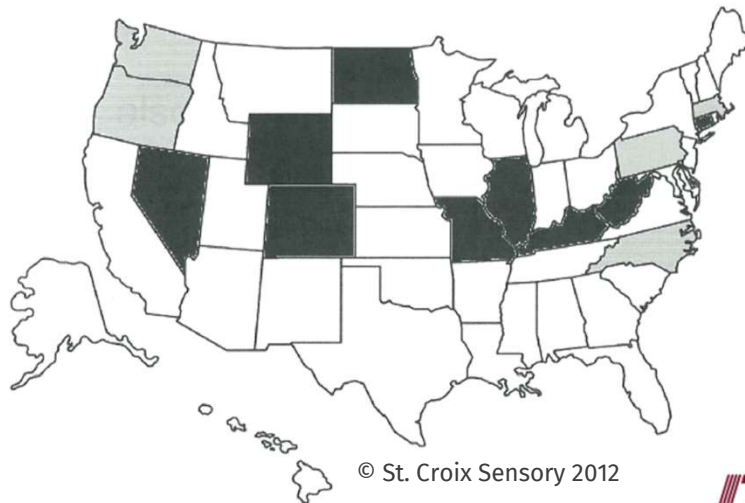
# Odor Regulations & Legal Implications





# USA Odor Legislation

- ▶ U.S. EPA does not regulate odor directly
- ▶ The regulation of odor is overseen by each state's governing environmental body
  - Independently, districts/counties/cities may also regulate odor
- ▶ Regulations and enforcement on odor issues vary greatly between states:



8\* States have odor statutes using the Dilution to Threshold as an enforceable odor limit (grey)  
5 States reference the properties of odors but without a specific numerical criteria (light grey)

\*WV and DE shaded grey in graphic but D/T standard no longer identified

# Odor Regulation in Ohio

## ▶ Ohio Nuisance Statute (R.C. 3767.13(A))

- No person shall erect, continue, use, or maintain a building, structure, or place for the exercise of a trade, employment, or business, or for the keeping or feeding of an animal which, by occasioning noxious exhalations or noisome or offensive smells, becomes injurious to the health, comfort, or property of individuals or of the public.

## ▶ Ohio Nuisance Rule (OAC 3745-15-07(B))

- The emission or escape into the open air from any source or sources of odors whatsoever that is subject to [regulation] and is operated in such a manner to emit such amounts of odor as to endanger the health, safety, or welfare of the public, or cause unreasonable injury or damage to property, is hereby found and declared to be a public nuisance. It shall be unlawful for any person to cause, permit or maintain any such public nuisance.

## ▶ Local municipal codes



## Ohio SIP Removal of Odor Nuisance

- ▶ November 19, 2020: U.S. EPA published decision to remove Ohio's air pollution nuisance rule from the Ohio SIP.
- ▶ December 19, 2020: Effective date of removal.
- ▶ January 19, 2021: Sierra Club, the Ohio Environmental Council and two private citizens filed a petition with the Sixth Circuit Court of Appeals requesting review of U.S. EPA's decision.
- ▶ January 19, 2021: Ohio EPA updated permit language to reflect that the nuisance rule is now a state-only enforceable provision.

## Odor Legislation & Regulations

- ▶ In most cases, the only time odor regulations are enforced is when there are complaints by the public to the regulatory body
  - Regulatory body takes action and/or
  - Lawsuits
- ▶ Complaints can vary in nature; the FIDOL principles should be considered (cumulative effect of FIDOL likely leads to citizen complaint)

## Ohio Enforcement Involving Odor Nuisance

- ▶ Heartland Petroleum (2011)
  - Settled \$280,000 civil penalty
- ▶ NewKor (2013)
  - Settled \$88,000 civil penalty and SEP valued at \$56,000
- ▶ Quasar and Buckeye Biogas, Collinwood BioEnergy, Three Creek BioEnergy and Wooster Renewable Energy (2016)
  - Dismissed
- ▶ Sunny Farms Landfill (2019)
  - Settled \$1.71 million civil penalty
- ▶ Renergy/Dovetail (2022)

# Historic US Odor Legislation

- ▶ Numerical standards tend to be D/T
- ▶ Some enforceable odor limits ca. 1960:

D/T	DESCRIPTION
2	Noticeable
7	Objectionable
15	Nuisance
31	Nauseating

Huey, 1960 Scentometer Odor D/T Categories

Where:

$D/T = \text{Volume of Carbon Filtered Air} / \text{Volume of Odorous Air}$

## US Odor Legislation – D/T

▶ Enforceable odor regulation/permit language might include:

... “ambient air that is less than D/T (Dilution to Threshold)”

... “compliant if **less than D/T**”

... “nuisance if **greater than or equal to D/T**”



# USA Odor Legislation Examples

States using the dilution-to-threshold (D/T) as an enforceable odor limit

STATE	REGULATED ODOR LIMIT
Colorado	7 D/T – Residential/Commercial 15 D/T – All other areas
Connecticut	7 D/T ; 3 samples in 1 hour
Illinois	8 D/T (Scentometer scale); Residential
Kentucky	7 D/T; 2 samples in 1 hour
Missouri	7 D/T; 2 samples in 1 hour
Nevada	8 D/T
North Dakota	7 D/T – Residential/near public receptor
Wyoming	7 D/T; 2 samples in 1 hour

Resource: St. Croix Sensory Document Library  
<https://www.fivesenses.com/library/>

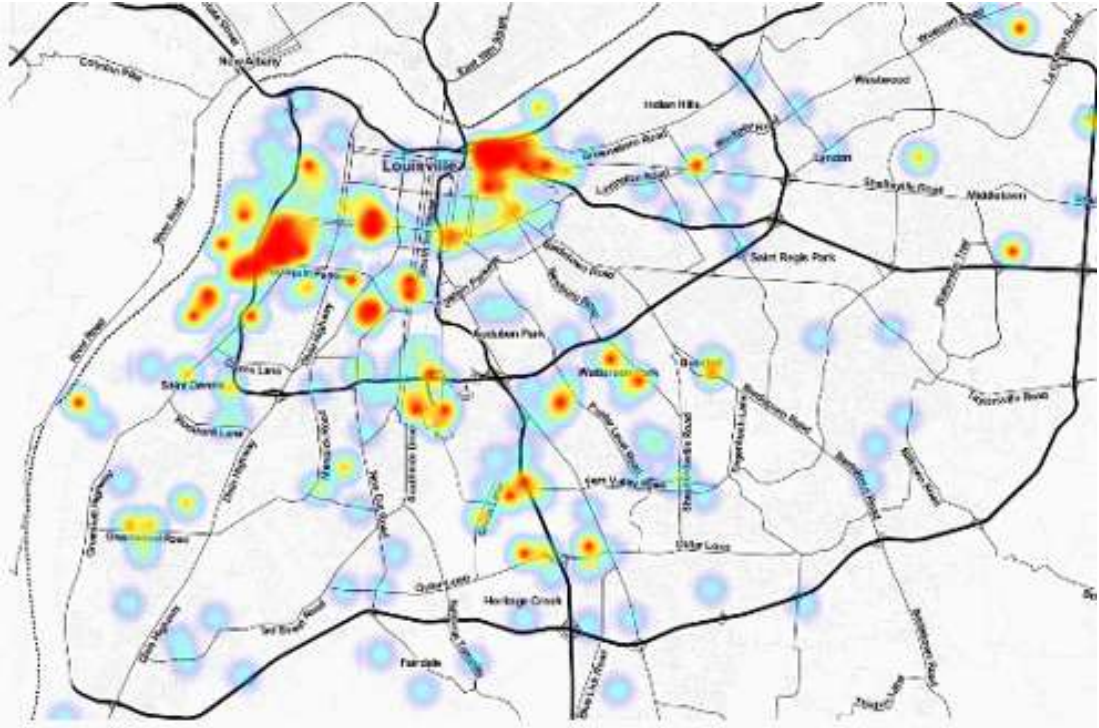
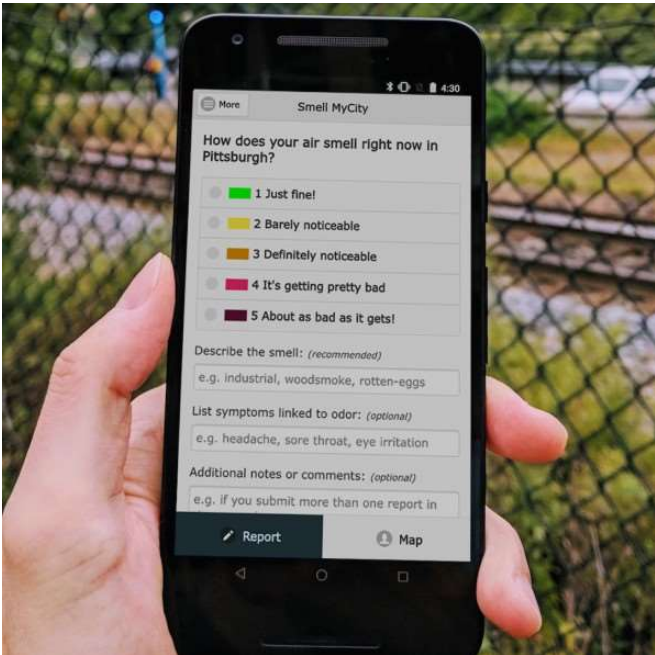




# USA Odor Legislation

STATE	REGULATION	AUTHORITY
Alabama	Air Pollution Control Program	Alabama Department of Environmental Management: Air Division
Connecticut	Control of Odors (22a-174-23, 2006)	Department of Energy and Environmental Protection
Delaware	7 Delaware Code Chapter 60, Environmental Control; Air Regulation Number 19	Department of Natural Resources and Environmental Control
Idaho	Policy for Responding to Odor Complaints	Department of Environmental Quality
Massachusetts	310 CMR, s.7.09: Air Pollution Control	Department of Environmental Protection
Missouri	Restriction of Emission of Odors (10 CSR 10-6.165)	Department of Natural Resources
North Carolina	Control and Prohibition of Odorous Emissions	Division of Air Quality
Oregon	Nuisance Odor Report	Department of Environmental Quality
Rhode Island	Air Pollution Control Regulations No. 17 Odors	Division of Air Resources
Texas	Odor Complaint Investigation Procedures	Texas Commission on Environmental Quality
Vermont	Nuisance Law	Department of Environmental Conservation
West Virginia	Nuisance Law	West Virginia Department of Environmental Protection

# Smell My City



## Key Takeaways

- ▶ Many int'l odor standards – most related to olfactometry (lab)
- ▶ Odor regulations in the US vary
  - Not regulated federally
  - Not all states have them
  - Can be regulated on county/city level
  - Can be focused on specific industries
  - In most cases – numerical standards are D/T
- ▶ Much of our odor projects in the US driven by nuisance issues
  - Other countries (Canada, Europe, Australia) – odor is part of regulatory process for permit application/licensing
- ▶ Check for local regulations often



# Measuring & Mitigating Odor



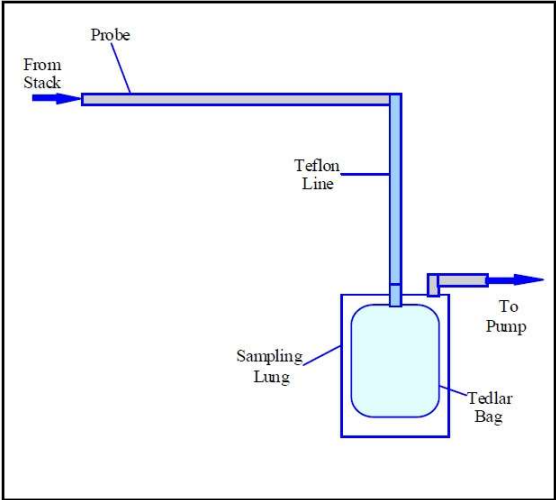
## Direct vs. Ambient Sampling

- ▶ Direct Sampling
  - Directly from stationary source (e.g. exhaust stack)
  - Lung Sampling or Dynamic Dilution Sampling
  - Used for predictive modeling
- ▶ Ambient Sampling (i.e., field olfactometer)
  - Sampling in general atmosphere
  - Site specific
  - Used for assurance

## Source Inventory and Impact

- ▶ Sources of odor must be isolated and quantified
- ▶ High quality data for impact assessment comes from a combination of direct source testing and predictive model analysis
- ▶ Direct measurement is preferable since ambient methods have many variables (which will be later explored)

# Lung Sampling



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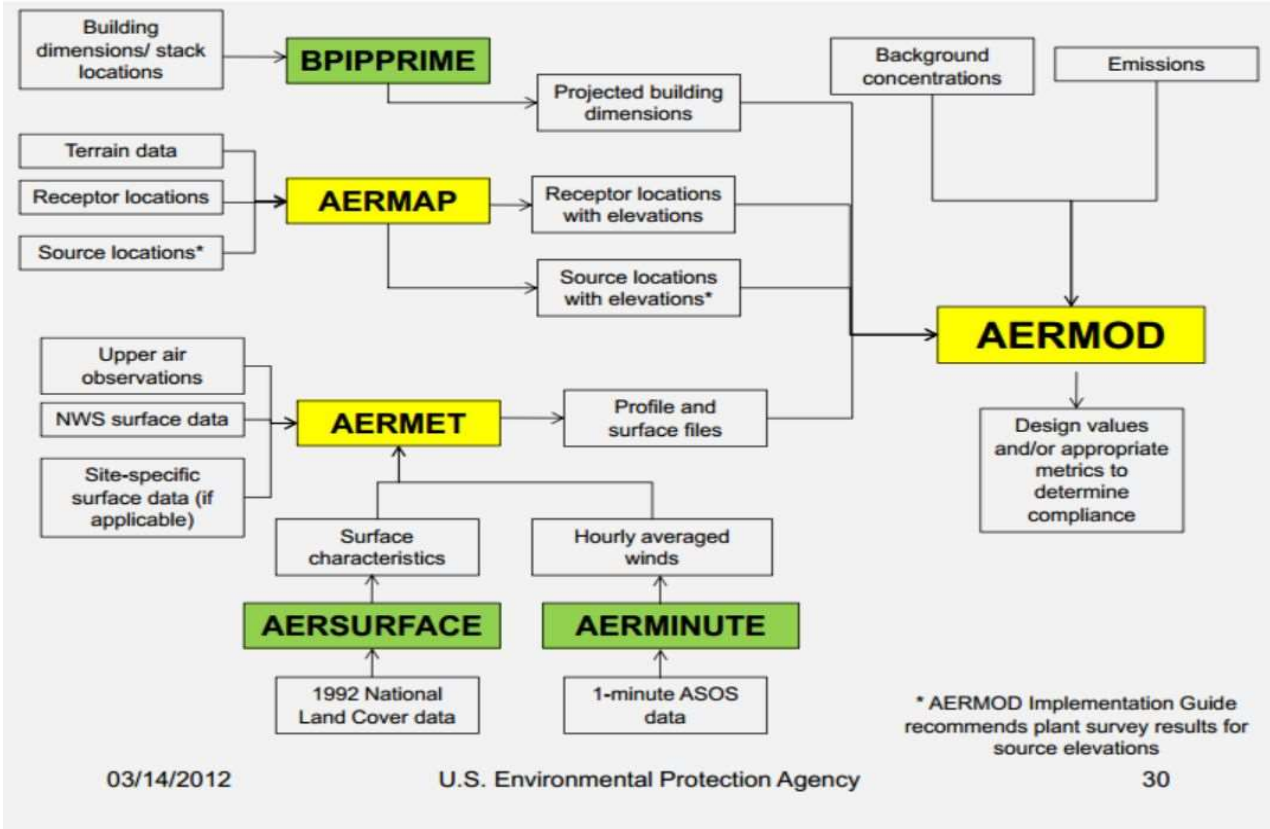


## Air Dispersion Modeling

- ▶ Mathematical assessment of contaminant impacts from emission sources within a study area
- ▶ Attempt to re-create or forecast what occurs during some event in nature
- ▶ Air quality dispersion modeling is a technique of calculating concentrations of pollutants resulting from atmospheric emissions
- ▶ Goal: simulate transport and dispersion
- ▶ Cost effective to predict multiple scenarios of air pollutant concentrations
- ▶ **However – you need source-specific emissions data, which means odor sampling**



# AERMOD Model



## Field Olfactometer

- ▶ Hand-held odor monitoring device
- ▶ Can be used to measure odor in addition to traditional stack/source sampling methods
  - Accurate “real-time” results
  - No sample degradation
  - On-site sample dilution
  - Can compare sample degradation

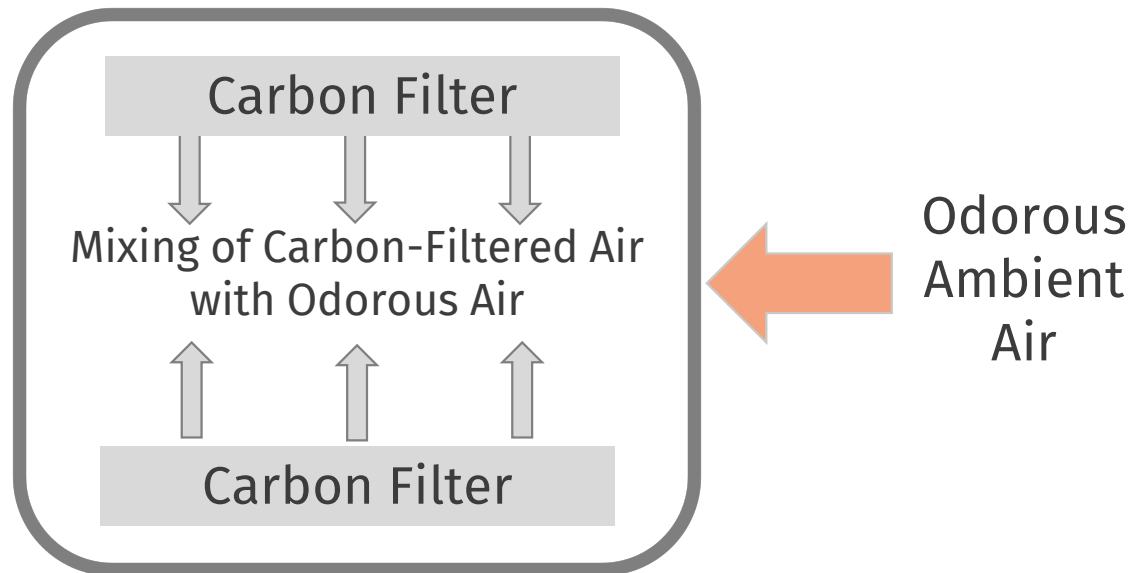
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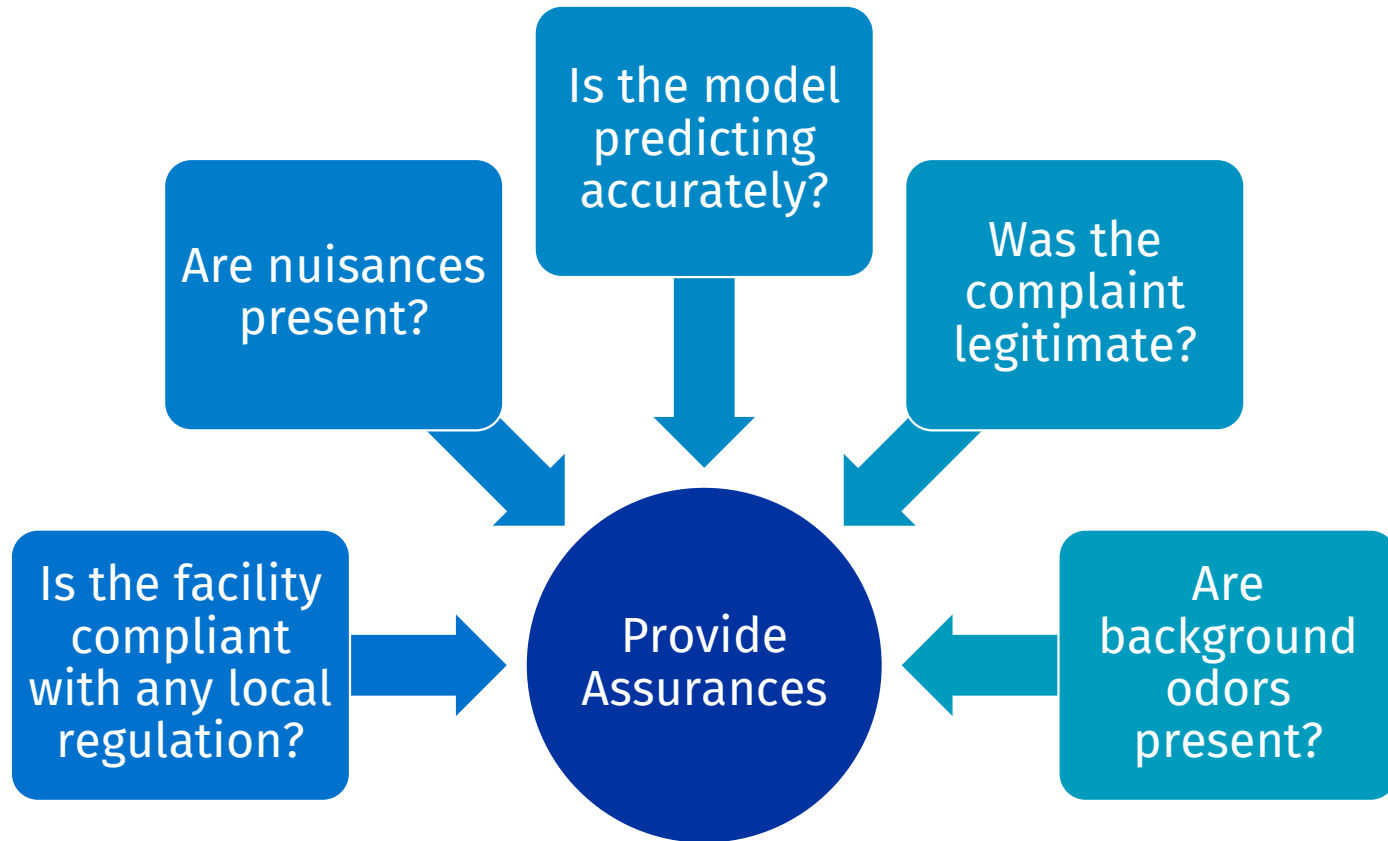


## How it Works

- ▶ Nasal Ranger Field Olfactometer Conceptual Schematic



# Ambient Monitoring



## Odor Monitoring Limitations

- ▶ Snapshot in time
- ▶ Weather (especially wind, precipitation)
- ▶ Access – limited to public areas and special permission
- ▶ Difficult to measure multiple points simultaneously
  - Teams of two may be beneficial

# Elements of an Effective Monitoring Program

- ▶ Monitoring plan
- ▶ Well labeled site plan
- ▶ Extended duration
  - Multiple day – ideally two seasons
  - Strategically spanning weeks is ideal
- ▶ Well documented climate conditions
- ▶ Teams of two
  - Upwind and downwind simultaneously, and/or
  - Same location simultaneously
- ▶ Reasonable radius of coverage
- ▶ Copious notes
- ▶ Operator certification (if field olfactometry is used)

# Assessment of Odor Impact at Sensitive Receptors

## Air Dispersion Modeling

- Predictive
- Not field intensive
- Conservative (typically)
- Extent of assessment is not limited  
(1 km radius can be readily extended to 50 km radius)

## Ambient Air Monitoring Programs

- Actual field measurement
- Snapshots of events
- Less conservative, highly variable
- Extent of assessment very limited by budget and time



## Reduction Solutions

- ▶ There are many possible odor abatement solutions that do not involve controls:
  1. Modify process or formulations to reduce odor creation
  2. Modify facility ventilation to minimize fugitive odor emission
  3. Modify process exhaust conditions
  4. Modify stacks to improve odor dispersion

# Odor Prevention

- ▶ Modifying process to reduce odor production at the source

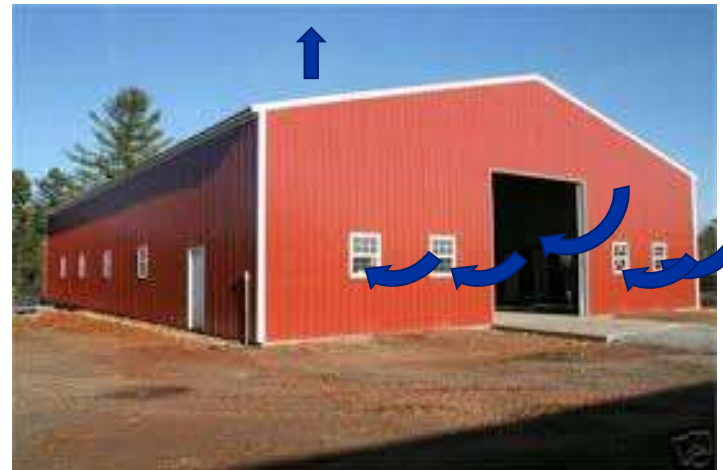
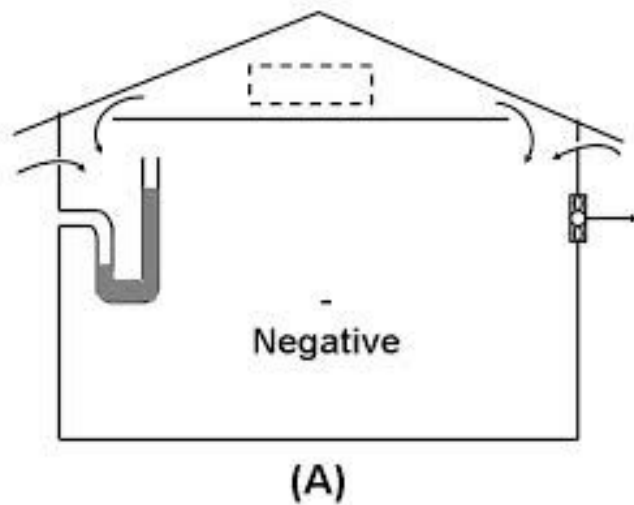
## Examples:

- Waste Water Treatment
  - ◆ Anaerobic Digestion to reduce H<sub>2</sub>S & Nitrogen levels
- Agricultural Industry
  - ◆ Reduce animal byproduct odors by altering livestock feed choices
- Manufacturing (e.g. paint)
  - ◆ Reduce/eliminate VOC additives



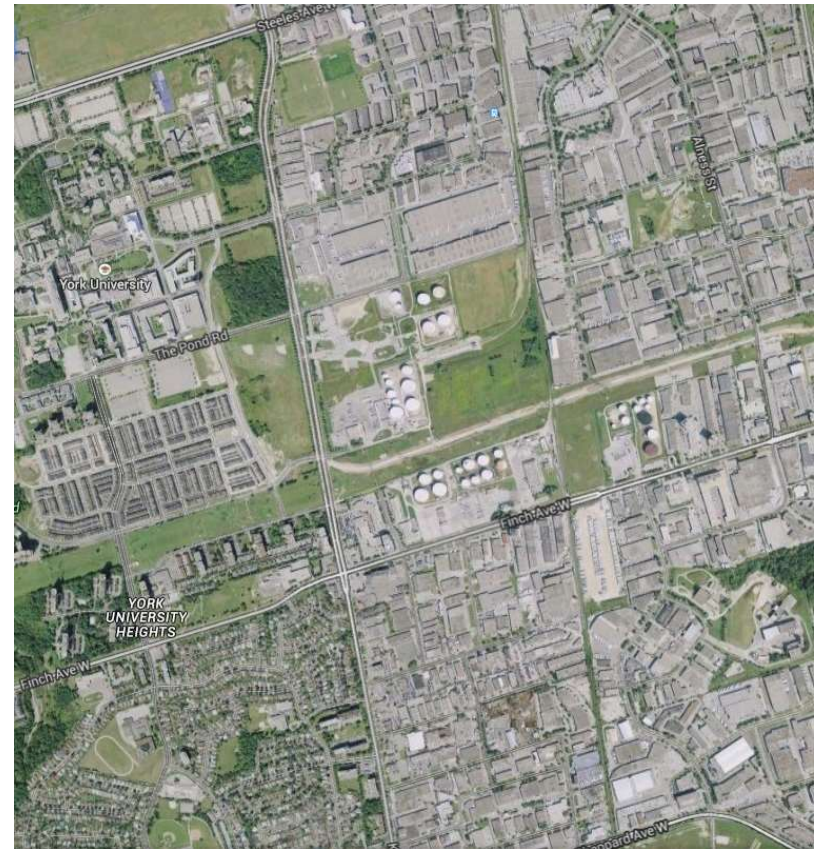
# Ventilation Strategies

- ▶ Reduce fugitive emissions from your facility by negative building pressure



## Buffer Zone

- ▶ Minimum distance from plant boundary where residential building is prohibited
- ▶ Based on concept that odor disperses 'exponentially' from source
  - True only under ideal weather conditions: low wind speed, no rainfall/low humidity
- ▶ Commonly enforced by regulatory body EPA



# Induced Turbulence

- ▶ Smooth, laminar air flow produces highest concentration of contaminant
- ▶ Turbulence helps disperse odor and reduce off site contamination



## Stack Alteration: Raising Stack Height

- ▶ Emission stacks can provide high concentrations of odorous gas at high volumes
- ▶ Higher stacks will result in greater dilution of odor as it disperses in the upper atmosphere
- ▶ Dispersion modeling can help determine optimal stack height for odor reduction

## Stack Alteration: Raising Stack Height

► Drawbacks:

- May result in higher odor concentrations further away from site
- May require significant stack increase to reduce odor
- May be expensive depending on your facility



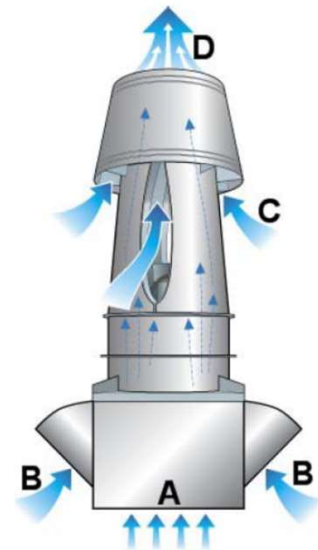
## Stack Alteration: Removing Rain Cap

- ▶ Can yield significant decrease in odor levels
- ▶ Inexpensive solution
- ▶ Rain caps reduce/eliminate upward plume velocity momentum
  - Penalized by model
  - Ground level exposure increases



## Stack Alteration: Increasing Air Flow (mixed-flow impeller fan)

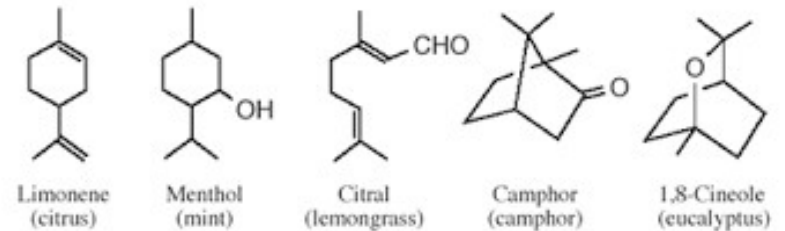
- ▶ Increasing air flow using supplemental non-odorous air will help in dispersing odorous compounds in two ways:
  - Introducing external flow yields higher release height in the atmosphere, allowing for greater dispersion
  - A “virtual” stack height is created via greater vertical plume momentum



- A: stack gas mixing plenum
- B: outside air dampers
- C: nearly twice as much additional fresh air introduced to contaminated mix
- D: discharged through optimized output nozzle

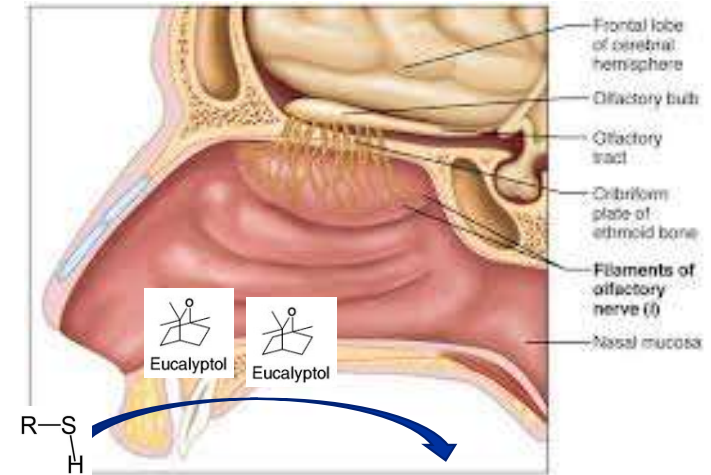
# Minimizing Perception

- ▶ Masking Agents
  - Oxygenated compounds
  - Terpenic compounds
    - ◆ Used in perfume Industry
  - Mask original scent with intention of overpowering unpleasant smell
  - May increase overall hedonic tone of odor
  - Result in higher overall odor levels, therefore may not satisfy regulators



# Minimizing Perception

- ▶ Inhibitors
  - Block specific receptors in the nose
    - ◆ E.g. **eucalyptol** blocks receptors sensitive to **mercaptans**
  - May be combined with masking agents
  - Used commercially in “odor eliminators” such as Febreze
  - Individual reactions to inhibitor can vary widely



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## Direct Treatment

- ▶ Physical/Chemical
  - Chemical Scrubber
  - Activated Carbon Filter
  - Incinerator/Flare
  - Ozone Generators
  - UV Filters
- ▶ Biological
  - Biofilter
  - Biotrickling filter



- ▶ **Be mindful of whether odor emissions can/are captured**

# Direct Treatment: Summary

Treatment	Ideal For	Efficiency	Benefit	Drawbacks
Neutralizers and Inhibitors	Large area sources	N/A	Can be sprayed directly to source or misted into the air	Does not actually reduce odors and may actually increase concentration using scents
Chemical Scrubbers	Stacks and other point sources	50-90%	Good efficiency for water soluble compounds	Low efficiency for non-soluble compounds. Chemicals are expensive and provide a source of water contamination
Activated Carbon Filter	Stacks and other point sources	99-9%	Excellent efficiency on most compounds	Expensive operating cost
Incineration	Stacks and other point sources with high VOC concentration	>90%	Good efficiency on most compounds	-Risk of explosion, fire, et. -Greenhouse emission -High operating costs
Bio-filter	Stacks and other point sources	75-99%	Low operating cost, low environmental impact, can be low installation cost	Requires large area for bio-bed
Bio-trickling Filter	Stacks and other point sources	75-99%	Smaller footprint	Higher installation cost
Ozone Generators	Stacks and other point sources, Sterilization	Largely varies	Good efficiency on most compounds. Can be used to sterilize air from virus, spores, etc.	-Partially oxidized VOCs -Excess ozone discharge
Cold Plasma	Stacks and other point sources, Sterilization	90%	Can be used to sterilize air from virus, spores, etc.	-Lower energy consumption -Better at reducing bio hazards
UV Filters	Stacks and other point sources, Sterilization	90%	Can be used to sterilize air from virus, spores, etc.	Higher operating cost than ozone generators

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## Odor Treatment: Some Costs

TREATMENT	CAPITAL COST	OPERATING COST
Chemical Scrubbers	\$1 - \$3 per scfm (EPA)	\$2 - \$37 per scfm annually (EPA)
Activated Carbon Filter	\$100 K - \$140 K	\$30 K - \$315 K annually
Incineration	\$25 - \$90 per scfm (EPA)	\$5 - \$75 per scfm annually (EPA)
Ozone Generator	N/A	N/A
UV Filter	N/A	N/A
Biofilter	\$50 K - \$495 K (EPA)	\$2.71 - \$20.75 per scfm annually (EPA)
Biotrickling filter	\$175 K - \$3,000 K (EPA)	\$0.23 - \$0.72 per scfm annually (EPA)
Taller Stack	\$50,000 +	None
Mixed-Flow Impeller	\$25,000 and up	Periodically mechanical work & Electricity costs
Neutralizers and Inhibitors	N/A	N/A
High-Level Containment	\$6.75 - \$12.6 per yd <sup>2</sup> (much higher for solid constructed containment)	Periodical maintenance
Low-Level Containment	\$3.15 - \$9.00 per yd <sup>2</sup>	Periodical maintenance

## Prevention and Procedures: Odor Management Plans

- ▶ Facility procedures to respond to any odor complaint and minimize odor impact
- ▶ Includes sections for:
  - Odor description/characterization
  - Time of day of complaint
  - Frequency & duration of complaint
  - Weather and location information



## An Effective Odor Management Plan Should Identify:

1. Defined objectives for the plan and a defined acceptable odor level
2. Procedures for complaint response and follow-up
3. Procedures to minimize odor releases
4. Protocols for odor event monitoring (when required)
5. Criteria for monitoring effectiveness of odor control technology and Odor Management Plan
6. Persons responsible and timelines for all identified tasks
7. Record of training/qualified persons





# Case Study in Measuring & Mitigating Odor



# Quantifying Odors – Sampling/Dispersion Modeling

Source Group	Release Height	Stack Orientation	Diam	Vertical Velocity	Stack/Fan Flow	# of Sources	Relative Odor <sup>a</sup>	Relative Dispersion <sup>b</sup>	Contribution <sup>c</sup>
--	ft	--	ft	ft/s	ft <sup>3</sup> /min	#	--	--	Avg % of Total
DC4b	30	Vert / Capped	1.70	--	2,010	1	10	2.56	42.5%
DC4a	16	Vert / Capped	1.70	--	250	1	1.24	1.36	20.1%
DC3	60	Vert	2.00	57.8	10,890	1	10	8.45	33.5%
MIXING	40	Mushroom	2.67	--	17,000	4	2.69	7.16	0.9%
FILLING	Varies	Horiz	Varies	--	4,500-8,500	7	0.08	4.98	2.6%
SMALL ORDERS	Varies	Horiz	Varies	--	1,620-4,000	4	0.36	10	0.5%
TANK LETDOWN	3	Horiz	2.26	--	2,928	3	0.03		

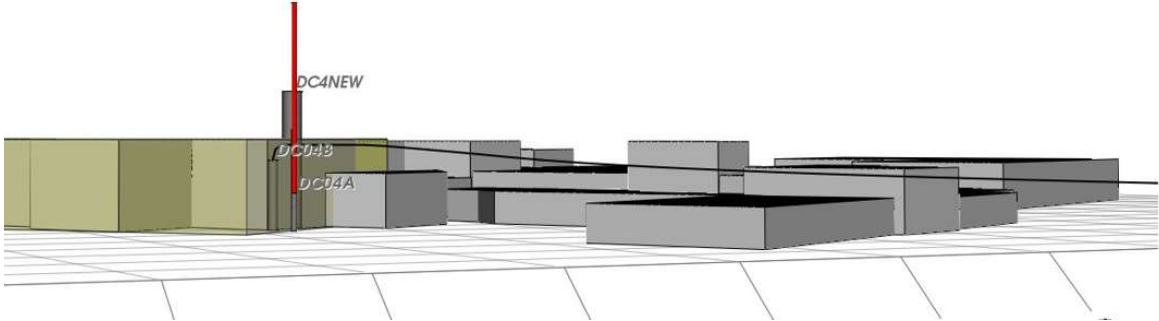
<sup>a</sup> Relative odor considers the sampled odor concentration and flowrate of the fan, with the value of "10" representing the highest value (sampled odor units x fan flowrate) and all other values relative to 10.

<sup>b</sup> Relative dispersion is determined independently from the odor investigation by placing all source groups into a dispersion model assumed to have 1 g/s organic compound emissions from each group. The value of "10" representing the poorest dispersion (i.e., highest average off-site impact across 11 receptors and 5 years of hourly meteorological data) and all other values relative to 10.

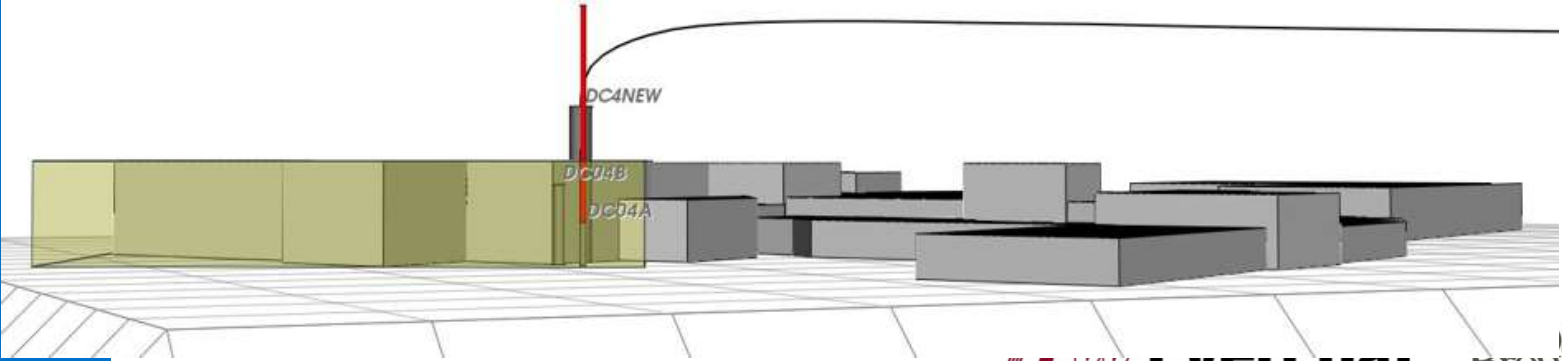
<sup>c</sup> The contribution refers to the contribution from one source group to the total impact at any given off-site receptor considering relative odor and relative dispersion.

# Mitigation – Low/Slow Stacks

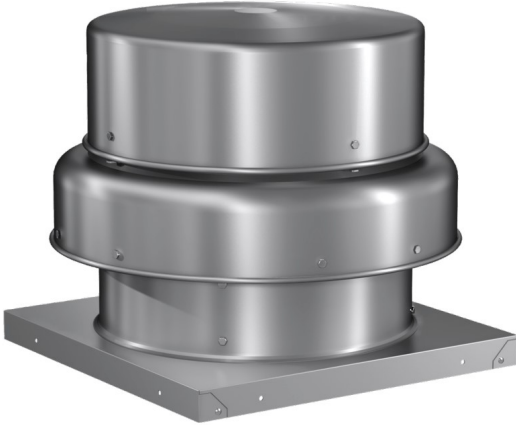
**BEFORE**



**AFTER**

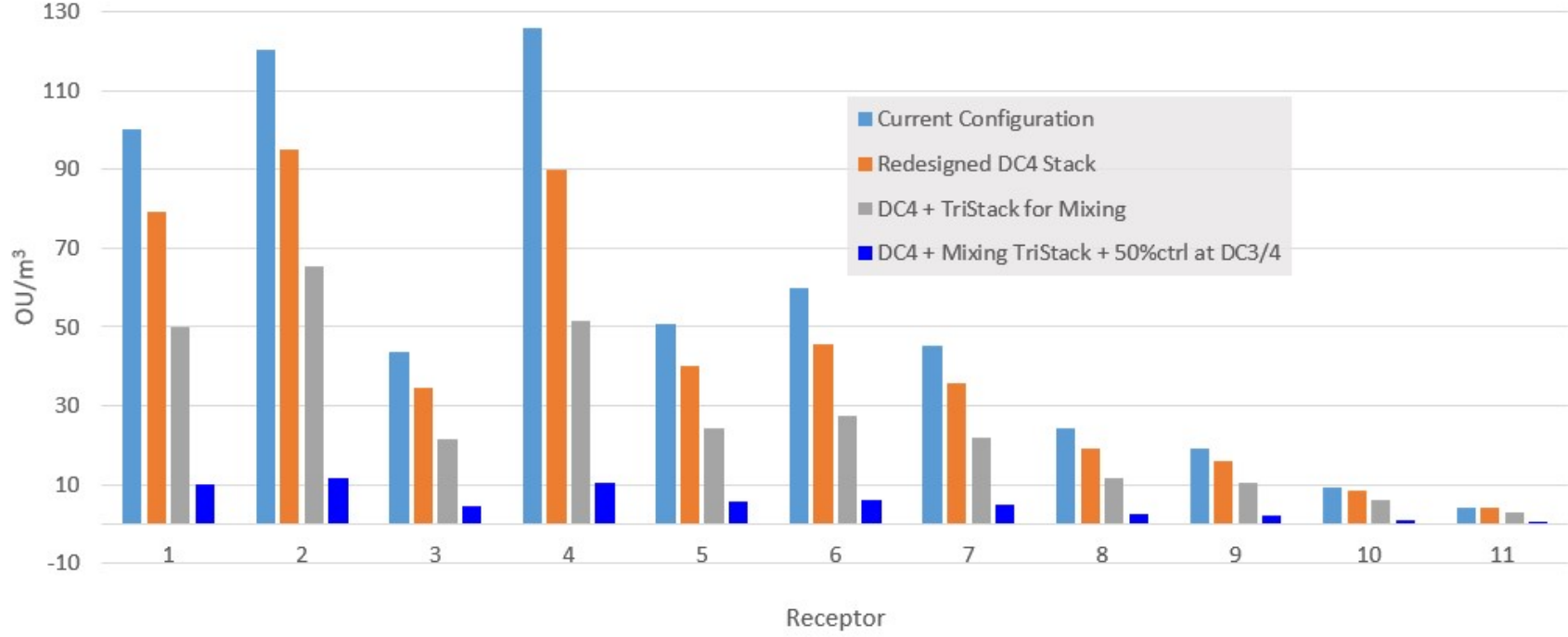


# Mitigation – Obstructed Vertical Releases

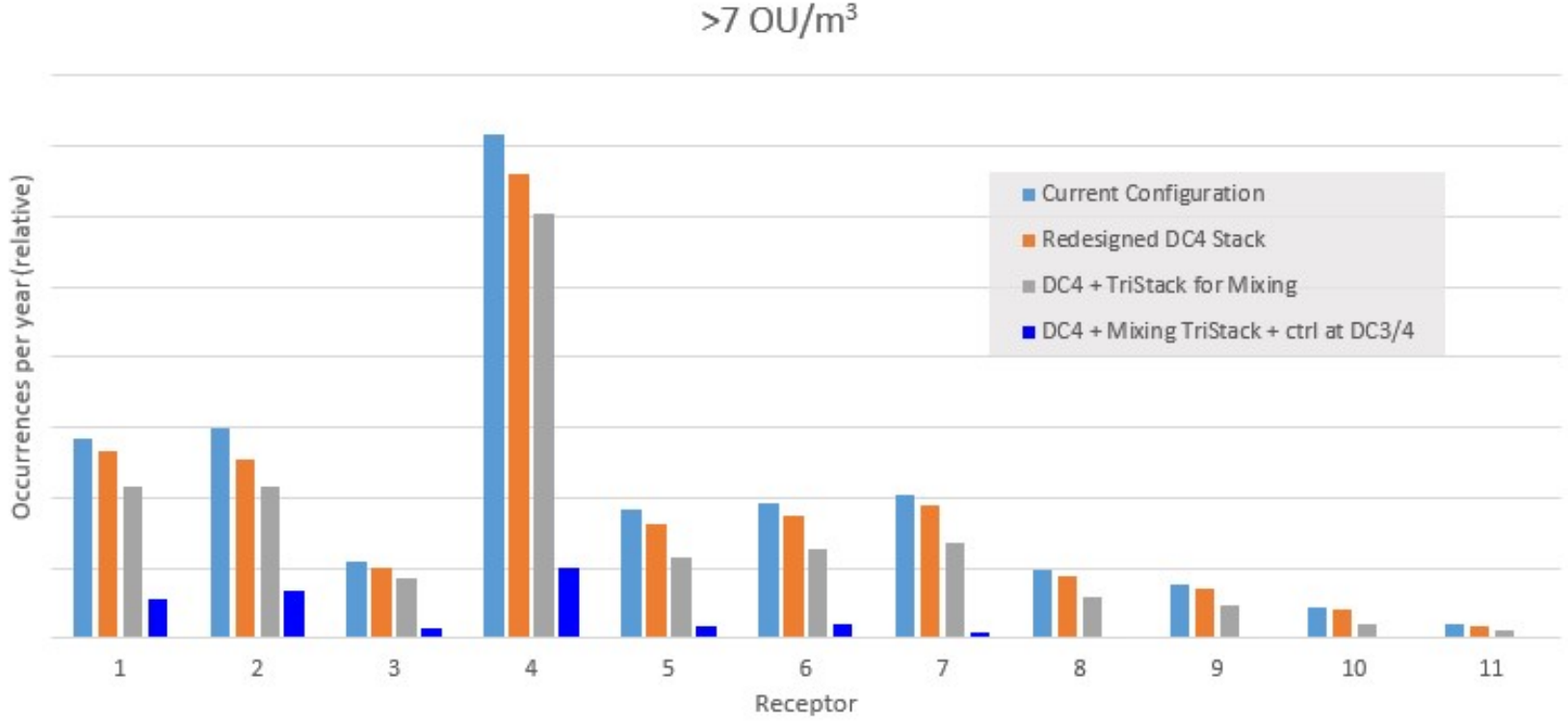


# Mitigation

99th Percentile Odour Impact



# Mitigation



# Benefits Beyond Odor

**Table 7-1. Summary of Carcinogenic Risks**

Risk Receptor	Scenario	Carcinogenic Risk	USEPA Target Cancer Risk Level	Below USEPA Target Cancer Risk Level?
Resident Adult	Baseline	6.98E-06	1E-05	Yes
	Post-Project	9.28E-07	1E-05	Yes
Resident Child	Baseline	1.39E-06	1E-05	Yes
	Post-Project	1.86E-07	1E-05	Yes

**Table 7-2. Summary of Non-carcinogenic Risks**

Risk Receptor	Scenario	Hazard Quotient	USEPA Target Non-cancer Risk Level	Below USEPA Target Hazard Quotient Level?
Resident Adult	Baseline	0.23	0.25	Yes
	Post-Project	0.03	0.25	Yes
Resident Child	Baseline	0.23	0.25	Yes
	Post-Project	0.03	0.25	Yes



# Engaging the Community on Odor





## Why engage?

- ▶ USEPA is bolstering efforts
  - Internal memos strengthening EJ through enforcement
    - ◆ April 26 *Using all Appropriate Injunctive Relief Tools in Civil Engagement Settlements*
    - ◆ April 30 *Strengthening Enforcement in Communities with Environmental Justice Concerns*
    - ◆ June 21 *Strengthening Environmental Justice through Criminal Enforcement*
    - ◆ July 1 *Strengthening Environmental Justice through Cleanup Enforcement Actions*
  - Restored federal Environmental Appeals Board (EAB)
  - Future rulemakings considered

## Why engage?

- ▶ Activism is at an all-time high
  - Where do people get their news?
  - Who is setting the narrative? Is it accurate?
  - How can you get involved/influence it?



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**Town, village of Darien await another summer of odor complaints**

**Michigan puts Arbor Hills landfill on notice over smells**

**Sriracha considers moving factory amid smell complaints**

**As neighbors raise a stink, DEC orders more odor control at Niagara Falls paper mill**

**South Carolina Plant Draws 17K Complaints for 'Noxious' Odor**

**'They have no choice but to fix it'  
SC lawmakers tour New-Indy  
papermill after complaints of  
'hydrogen sulfide odor'**

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# Identify Stakeholders

- ▶ What is the political landscape?
- ▶ Who is consistently making public comments?
  - Where is their audience?
  - What are their concerns?
  - Are there patterns?
- ▶ Establish relationship with local government, emergency response personnel, environmental groups
- ▶ Don't overlook citizen scientist efforts

7:38



Individuals that complete the survey, will receive a \$25 Amazon Gift Card by mail.

If you are interested in taking the survey please visit: [redacted] and enter the access code: K9P74AK3N.

Thank you for your time, if you have any questions please email: [redacted]

## GET INVOLVED!

### A STUDY ABOUT INDUSTRIAL AIR POLLUTION IN [redacted]

#### DID YOU KNOW?

Certain industries in [redacted] periodically emit volatile organic compounds (VOCs) or semi-VOCs (sVOCs) into the air. [redacted] and [redacted] residents have partnered on a pilot project to study it. We hope that by learning more about the air quality in [redacted] community members can better communicate with decision-makers about industrial air pollution. We may also use the pilot study results to apply for funding to conduct more in-depth research.

#### HOW ARE WE STUDYING IT?

We will collect air samples outside of homes that are within ¼ mile of the industrial facilities. The air sampling will measure chemicals in the air to determine if the air pollution in [redacted] is different from the traffic-related air pollution in Atlanta.

Are you interested in having air samples collected at your home?

Are you at least 21 years old?

Do you live in [redacted] GA?

Are you able to make decisions for your household?

**IF SO, YOU MAY BE ELIGIBLE TO PARTICIPATE!**

To find out, contact:  
Theresa Williams  
Research Assistant

Want more information?



12

4 Shares

**ITW Evercoat**

BI



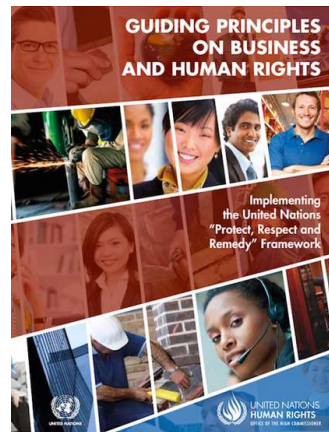
## Prepare and Coordinate Messaging

- ▶ Develop facility (or project) narrative
  - Highlight emissions reductions
  - Discuss control technology improvements
- ▶ Work with public relations team or surrogate, include in PR plan
- ▶ Assess social media presence and develop a communications strategy
- ▶ Engage early/often so you can address concerns early in project scoping (or before there is a project) – rather than after all decisions have been made



# Invest in Bridge Building

- ▶ Identify the correct personnel, plans, strategy based on your situation and stakeholders
- ▶ Connect with community members/groups
  - Public meetings
  - Site tours
  - Focus groups
- ▶ Develop a Community Advisory Panel (CAP)



## Community Advisory Panels

As a company in the chemical industry, we are aware of the particular responsibility we have towards the local communities around our sites. We aim at engaging openly with our neighbors in various forms of neighborhood dialogs.



Our different tools for community relations depend on the specific site context, among them Community Advisory Panels. Mostly used at larger production sites, a Community Advisory Panel is a continuous, long-term discussion forum for open dialog. It consists of a group of individuals who live near or around a chemical facility and who represent the fabric of their community. The CAP meets regularly to discuss issues of mutual interest. It is a forum for open and honest dialog between citizens and site management. Our global internal requirements for Community Advisory Panels have been developed based on the [UN Guiding Principles for Business and Human Rights](#) for grievance mechanisms. The goal is to provide the community with the opportunity for direct involvement, while allowing us to better address the local expectations. We can only be successful if we enjoy the trust and support of our neighbors.

<https://www.unglobalcompact.org/library/2>

# Seek Industry Group Support

- ▶ Industry groups have awareness and concern for issues that impact their members
- ▶ Provide education, resources
- ▶ Invest financially in solutions



## Fact Sheet: Harris County Public Private Air Monitoring Initiative

### OVERVIEW

A strong air monitoring system is getting even stronger thanks to a collaborative effort between Harris County, an independent research group and private industry. The groundbreaking initiative is made possible by a \$1 million grant to Harris County from the American Chemistry Council (ACC) Foundation. The administration of this grant is being led by the office of Harris County Precinct 2 Commissioner Adrian Garcia.

### KEY TAKEAWAYS

- New air monitoring initiative will enhance the collection of air monitoring data and improve air quality knowledge during significant industrial incidents.
- Harris County is adding a large array of new air monitoring equipment to its network.
- Houston Advanced Research Center is providing Harris County with new tools to interpret air monitoring data.
- Local officials will get timely and useful data to help inform public health decisions.

### SPECIFICS



#### Air Monitors

Harris County is deploying the following new equipment:

- **1 Stationary Gas Chromatograph (GC)** unit located in Friendship Park, Seabrook
- **4 Semi-stationary Sensit<sup>®</sup> SPOD** units located in:
  - Hartman Park in Manchester
  - Barrett Station near Crosby
  - River Terrace Park in North Channel
  - Fairmont Park in La Porte
- **8 Portable DustTrack<sup>™</sup>** units to be used by Harris County Pollution Control Services (PCS) staff
- **55 handheld Multi-Gas Detectors** to be provided to the following emergency response teams:
  - Harris County Fire Marshal Hazardous Materials Team
  - City of Houston Fire Department Hazardous Materials Team
  - City of Baytown Fire Department Hazardous Materials Team



#### Scientific Support

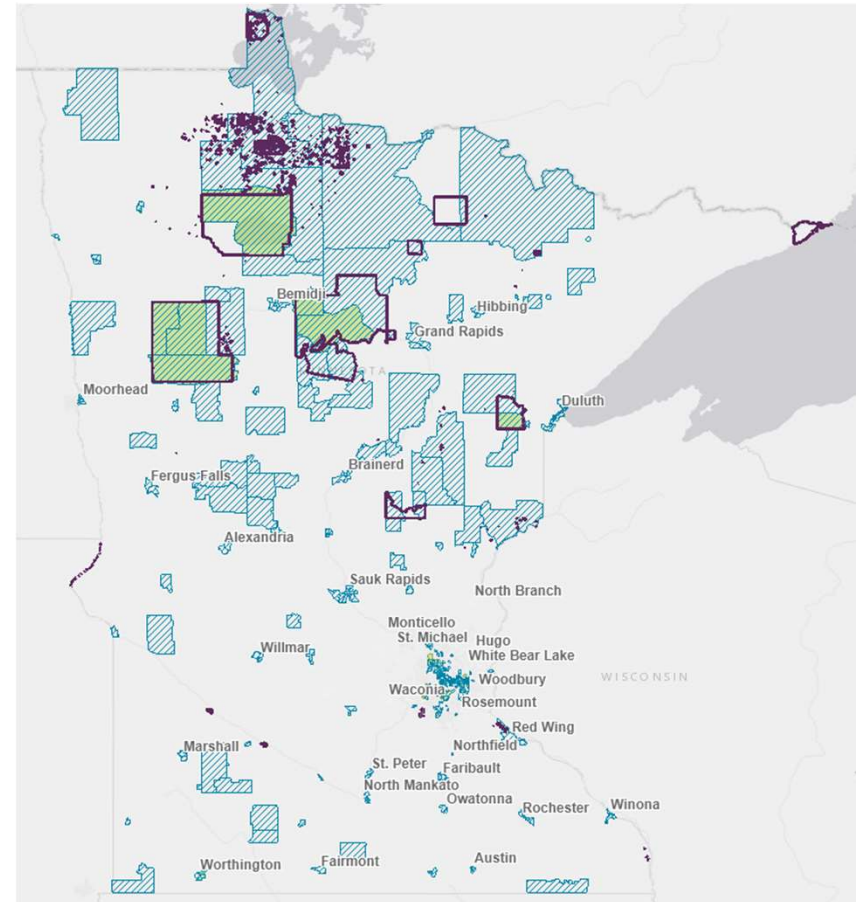
HARC is supporting Harris County with the following:

- Analysis of air quality data and meteorological modelling.
- Development of protocols for interpreting and communicating air monitoring results with a focus on industrial incidents and weather events.
- Additional analysis and communication assistance during emergencies.



# Conduct EJ Screening Analysis

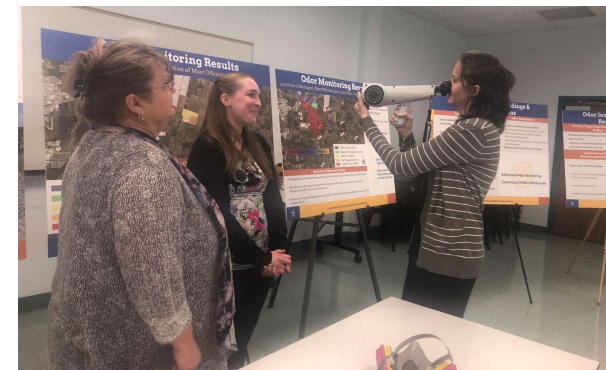
- ▶ Identify and characterize EJ areas
  - Triggering events
  - Permitting
  - Compliance/inspections/emissions events/enforcement
  - Community complaints
  - Federal/state/local definitions of EJ communities
- ▶ EJSCREEN/state-equivalent identification of EJ areas, tools maps





## Meeting Format

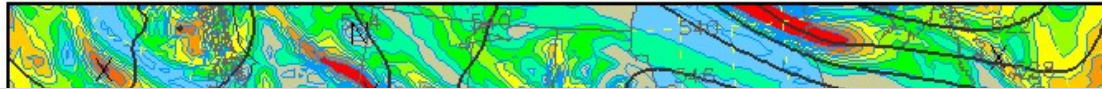
- ▶ Avoid “talking heads”
  - Open houses
  - Public meetings
  - Focus groups (i.e., small group)
- ▶ Multiple ways to get information
- ▶ Facility tours (if on location)
- ▶ Human comforts: refreshments, security



# Simplify Technical Information

500 mb Heights (dm) / Abs. Vorticity ( $\times 10^{-5} \text{ s}^{-1}$ )

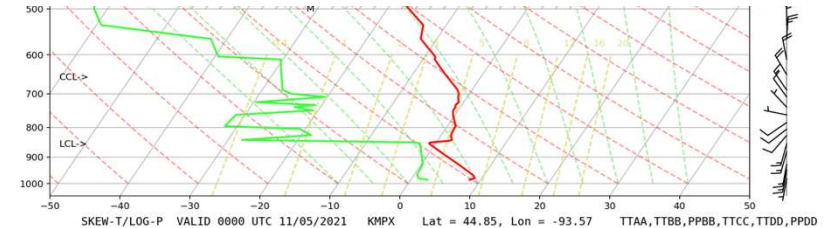
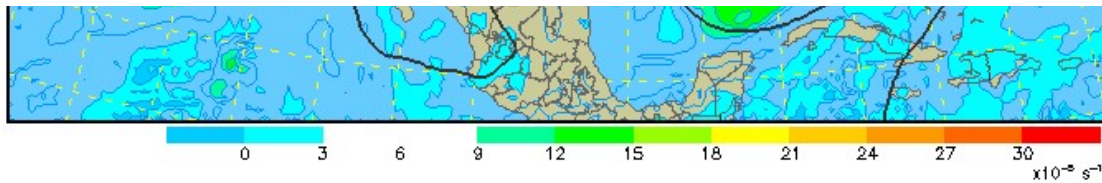
36-hour forecast valid 1200 UTC Sat 06 Nov 2021 NAM (WRF-NMM) (00z 05 Nov)



KMSP	NAM MOS GUIDANCE		11/04/2021		1200 UTC																
DT /NOV	4/NOV	5	/NOV		6	/NOV		7													
HR	18	21	00	03	06	09	12	15	18	21	00	03	06	09	12	15	18	21	00	06	12
N/X							40		54			41							59		44
TMP	46	50	48	45	44	43	42	44	50	53	51	49	46	44	43	43	53	58	56	50	46
DPT	31	32	34	36	36	37	37	38	40	40	41	43	41	39	38	34	37	40	42	41	39
CLD	CL	SC	BK	SC	BK	BK	OV	OV	OV	OV	OV	OV	OV	CL	CL	CL	SC	CL	SC	CL	BK
WDR	18	19	17	18	17	18	17	16	17	17	16	18	23	22	22	23	24	26	19	14	12
WSP	06	07	06	06	06	07	09	11	13	14	09	08	07	05	05	06	06	06	06	04	04
P06			1		0		0		4		3		5		1		3		3	6	10
P12							0				4				5				3		10
Q06			0		0		0		0		0		0		0		0		0		0
Q12							0				0				0				0		0
T06			0	1	0	0	0	0	0	0	3	1	1	0	1	0	0	0	0	0	3




Extended Forecast for Saint Paul MN

Tonight	Friday	Friday Night	Saturday	Saturday Night	Sunday	Sunday Night	Monday	Monday Night
Partly Cloudy	Partly Sunny	Decreasing Clouds	Sunny	Partly Cloudy	Partly Sunny	Partly Cloudy	Mostly Sunny	Mostly Cloudy
Low: 38 °F	High: 56 °F	Low: 43 °F	High: 62 °F	Low: 42 °F	High: 64 °F	Low: 44 °F	High: 58 °F	Low: 41 °F



# Simplify Technical Information

## Truck Traffic & Operation Schedule

Parameter	“Worst case” Hypothetical Maximum*	Expected Actual
	10-12 per hr	6-8 per hr
	1 per 6 min	1 per 10 min
	20 hr per day 6 day per week	12 hr per day 6 day per week

\*Required to evaluate worst case for air permit approval

## Monitor Information

- ▶ Continue to monitor community messaging
  - Setup of “listening” alerts / Google alerts
  - Social media
  - Outlets specific to your community
- ▶ Self-advocate – during agency negotiations, request information on the outreach that is occurring

Before you speak:

**THINK**

**T** = Is it True?

**H** = Is it Helpful?

**I** = Is it Inspiring?

**N** = Is it Necessary?

**K** = Is it Kind?

## Involve Correct People

- ▶ Hire correct experts
- ▶ Public relations person should be empathetic, but firm
- ▶ Be truthful and true to your word (follow up if you say you will) but don't share more than necessary, especially in complaint situations
- ▶ Efforts will positively impact community as well as facility personnel

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## Summary

- ▶ Community engagement will be a reality
- ▶ Initial tasks include
  - Identify stakeholders
  - Prepare and coordinate messaging
  - Invest in bridge building
  - Seek industry group support
  - Conduct EJ screening analysis
- ▶ Considerations for successful engagement
  - Meeting format
  - Simplify technical information
  - Monitor information
  - Involve correct people



## **Biographical Information**

**Sarah Keyes**  
**Regulatory Affairs Manager**  
**ITW Evercoat**  
**Blue Ash, OH**  
**skeyes@evercoat.com**

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**Jarod Gregory**  
**Senior Consultant**  
**Trinity Consultants**  
**11949 Foxgate Way**  
**Loveland, OH**  
**5135028219**  
**jarodwgregory@gmail.com**

Jarod Gregory is a Senior Consultant in Trinity Consultants' Northern Kentucky/Greater Cincinnati office. He provides a wide array of support and solutions to both Kentucky and Ohio clients including state and federal air quality permitting, NSPS and MACT compliance assistance, emission inventory development, and chemical inventory reporting. He is also a member of Trinity's odor support services team, with extensive experience in on-site and off-site odor sampling, dispersion modeling, and development of Odor Mitigation Plans. He holds a B.S. in Chemical Engineering and M.S. in Environmental Engineering from the University of Cincinnati.

- Managing Odour Emissions in The Covid Era; Clean Air Society of Australia and New Zealand (CASANZ), Virtual; April 2021
- Modernizing Your Emissions Inventory; KY Chamber Permitting Conference, Lexington, KY; March 2021
- Emissions 2020: An Air Emissions Reporting Odyssey; KY Chamber Permitting Conference, Lexington, KY; August 2020
- Odors- Air Quality Issues Beyond the Four Corners of Your Permit; KY Chamber Permitting Conference, Lexington, KY; August 2019
- Centralizing Calculations for Enhanced Chemical Reporting Compliance; Manufacturer's Education Council (MEC) EH&S Symposium, Cincinnati, OH; March 2018; KY Chamber Permitting Conference, Lexington, KY; March 2018
- Best Practices in Air Permitting & Compliance; MEC Permitting Conference, Columbus, OH; July 2017



## Chris Kim Kahn

### Member

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Cincinnati, OH 45202

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#### Industries

Energy  
Utilities  
Manufacturing  
Mobility

#### Practice Areas

Environmental

#### Bar Memberships

Ohio

Chris is a member in the Environmental Practice Group. She has experience in advising and defending clients with respect to many areas of state and federal environmental law, including the Clean Air Act, Clean Water Act, the Comprehensive Environmental Resource, Compensation and Liability Act, the Resource Conservation and Recovery Act, the Underground Storage Tank Act, and the Emergency Planning and Community Right-to-Know Act.

Chris focuses her practice on counseling clients on regulatory matters and regularly counsels buyers, sellers, and lenders on environmental risks in real estate and corporate transactions. Chris has defended federal and state enforcement actions and has conducted environmental audits and internal investigations for industrial clients. Chris helps clients with complex remediation projects, emergency response to spills and/or releases of hazardous substances, matters requiring internal investigations and root cause analyses, as well as voluntary self-disclosures under state and federal audit policies and statutes.

Prior to joining the Firm, Chris was an Assistant Attorney General at the Ohio Attorney General's Office, where she enforced state air pollution control laws and regulations.

## Other Info About Chris

#### Education

Washington University School of Law, J.D., 2010  
*Washington University Law Review*, Competition and Development Editor  
Williams College, B.A., 2007

#### Courts

U.S. District Court for Southern District of Ohio



U.S. Court of Appeals for the Sixth Circuit

U.S. Court of Appeals for the District of Columbia Circuit

### **Recognition**

*Best Lawyers: Ones to Watch in America*, Environmental Law, 2021-2022

*Cincinnati Business Courier*, Forty Under 40 Honoree, 2020

YWCA of Greater Cincinnati, Rising Star Honoree, 2017

### **Professional Affiliations**

Ohio State Bar Association

Cincinnati Bar Association

### **Civic Activities**

Mason Arts Council, Board Member, 2019-Present

City of Mason Zoning Board of Appeals, Member, 2019-Present

Commercial Real Estate Women (CREW), Greater Cincinnati Chapter, Member, 2013-Present

Asian Pacific American Bar Association, Cincinnati Chapter, Member, 2016-2017

Cincinnati Korean American Association, Member, 2013-2015

### **Presentations**

Presenter, “Don’t Cry Over Spilt Oil! Best Practices for SPCC Compliance,” Kentucky Environmental Conference, Kentucky Chamber, March 2022

Presenter, “[Clean Water Best Management Practices...Storm Water Permitting; Spill Prevention, Control, and Countermeasure \(SPCC\) and Stormwater Pollution Prevention Plan \(SWPPP\) Compliance](#),” Sustainability and Environmental Health & Safety Symposium, Manufacturers’ Education Council, March 2022

## **Frost Brown Todd Articles**

[Ohio Bona Fide Prospective Purchaser Defense is Here](#)

[Manufacturers, Importers and Processors of Certain Nanoscale Materials Must Report to EPA](#)

[U.S. EPA Continues its Focus on Chemical Risks](#)