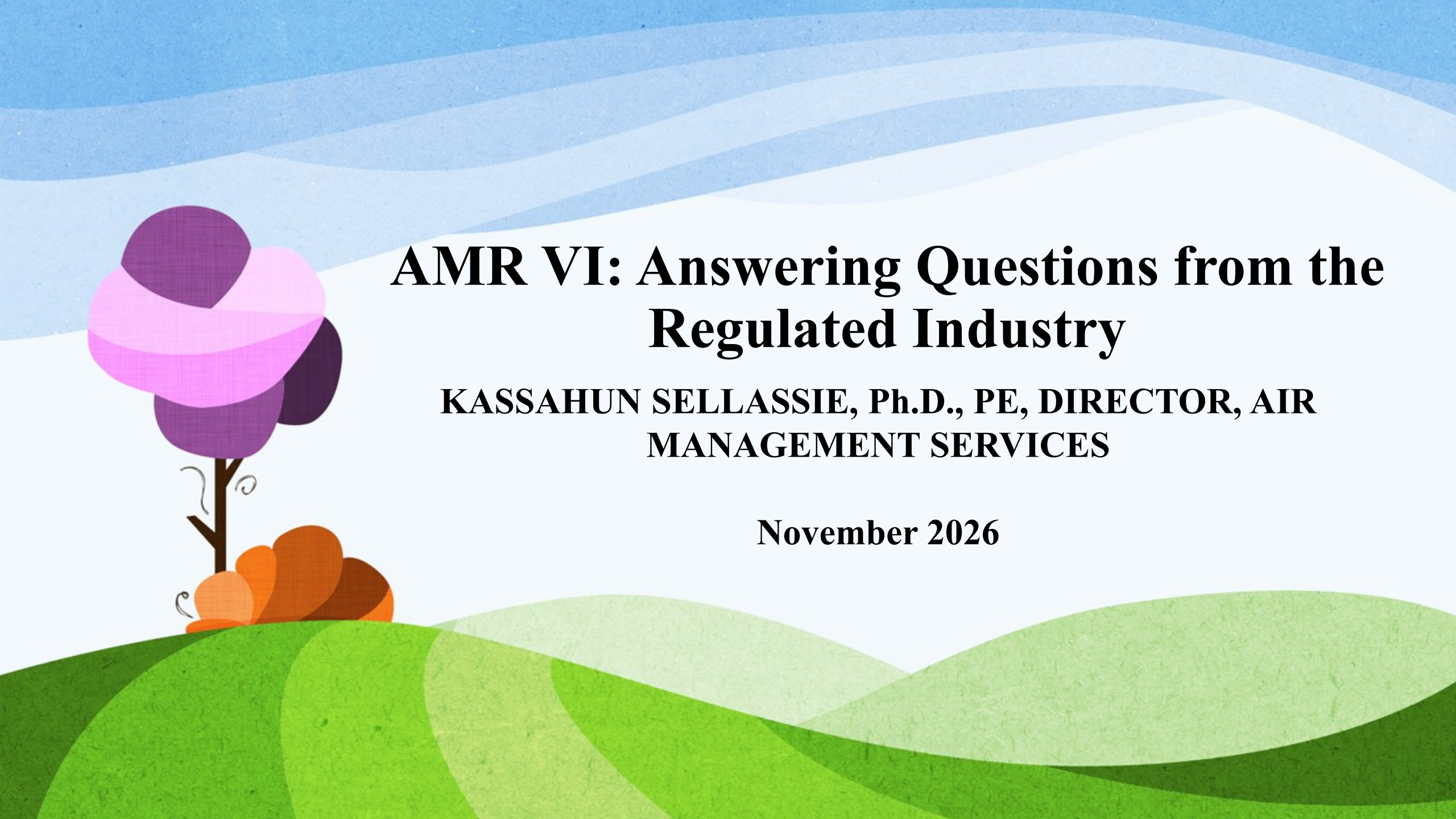


A stylized landscape illustration featuring rolling green hills in the foreground, a small tree with purple and pink foliage on the left, and blue and white wavy lines representing hills or clouds in the background.

AMR VI: Answering Questions from the Regulated Industry

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MANAGEMENT SERVICES**

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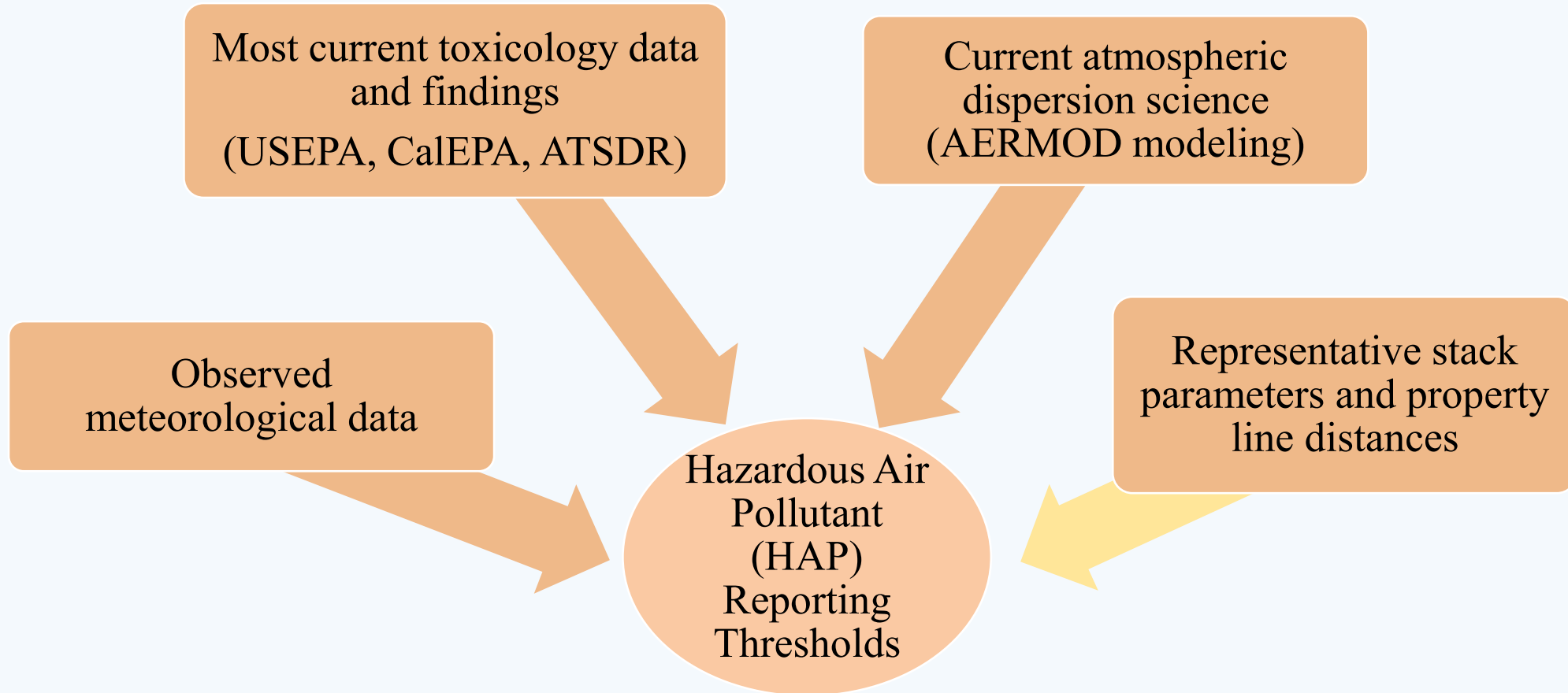
Background

- The Philadelphia Department of Public Health's (PDPH) mission is to protect and promote the health of all Philadelphians and provide a safety net for the city's most vulnerable.
- **Toxic air contaminants (TACs)** are chemical substances, which when released into the atmosphere, are known or suspected to cause cancer or other serious health effects.
- **Air Management Regulation VI (AMR VI), "Control of Emissions of Toxic Air Contaminants,"** was established in 1981 to reduce the emission of toxic air contaminants within the City.
 - AMR VI had not been updated since the 1980s and relied on unacceptable, outdated standards.
 - Amendments to AMR VI were passed by Philadelphia's Air Pollution Control Board (APCB) after extensive public input spanning several years and went into effect on January 1, 2024.
 - As amended, AMR VI is based on modern science and advances public health and environmental justice in Philadelphia.

The Goal of AMR VI Amendments:

- To be more protective of human health, considering the latest scientific knowledge
- To have hazardous air pollutant (HAP) reporting thresholds, as well as risk screening, based on air quality modeling with conditions specific to Philadelphia
- To simplify the screening process for permit applicants - using an Excel-based Screening Workbook

Methodology



Summary of Differences Between the 1981 AMR VI and the 2023 AMR VI

- Increasing the number of regulated TACs from 99 to 217
- Changing the threshold for TACs based on updated science and requiring a health risk assessment for facilities that exceed any TAC thresholds
- Requiring new plan applicants and large facilities to estimate cancer and non-cancer risks to the community
 - Title V facilities must also consider the “background” cancer risk of nearby census tracts in their assessments using the EPA TO-15 method; Regulatory HAP measurement; MMS mobile lab measurement throughout the city and others (Picarro, Radiolo)
- Requiring a risk mitigation plan from any facility that estimates cancer risk above one per million or a non-cancer hazard quotient above 1
 - Risk mitigation may be required before permits can be approved

AMR VI Applies to:

- **New plan approvals or installation permit applications** for devices that could emit more than the reporting threshold of any TAC.
- **Title V permits** (new applications or renewals), if the facility may potentially exceed any TAC reporting threshold.
- **Permit modifications** that may increase TAC emissions above any TAC reporting threshold.

HAP Reporting Thresholds

- The AMR VI amendment established a **Reporting Threshold** for each HAP (Toxic Air Contaminant)
- Reporting Threshold – A pollutant emission rate (tons per year, or pounds per year) where the Philadelphia Department of Public Health has determined a health risk analysis is necessary due to health concerns.
- Facilities/sources report potential HAP emissions on a permit application
 - When a source operation's potential to emit > Reporting Threshold:
conduct risk assessment

Using Reporting Thresholds in Permitting

Risk Screening Worksheet

- If applicant has at least 1 HAP with proposed emission rate above reporting threshold: Risk Screening required.
- Enter emission rate, stack height and closest stack-to-fenceline distance: worst-case scenario cancer and non-cancer risks are calculated
- If risk exceeds benchmark, further evaluation (facility-specific modeling) is required; Otherwise, no further evaluation.

Emission Unit/Batch Process ID No.			Stack height ¹			ft
Emission Point ID No.			Distance to property line			ft
Equipment ID No(s).			Annual air impact value, C'			(ug/m ³)/(ton/yr)
Operating Scenario(s)			24-hour air impact value, C' _{st}			(ug/m ³)/(lb/hr)

KEY:

Long-Term Effects

Q = Annual emission rate (in tons per year) contributed from the source

C = C' x Q = Annual average ambient air concentration

URF = Unit risk factor (for carcinogenic risk)

IR = C x URF = Incremental risk (for carcinogen)

RfC = Reference concentration (for noncarcinogenic effects)

HQ = C/RfC = Hazard quotient (for noncarcinogenic risk)

Rslt = The result of comparing the IR or HQ to the negligible threshold (FER if > threshold, Negl. if <= threshold)

FER = Further Evaluation Required (See Notes for thresholds)

Negl. = Negligible (See Notes for thresholds)

Short-Term Effects

Q_h = Hourly emission rate (in pounds per hour)

C_{st} = C' x Q_h = Short-term average ambient air concentration

RfC_{st} = Short-term reference concentration (for noncarcinogenic effects)

HQ_{st} = C_{st}/RfC_{st} = Hazard quotient for short-term noncarcinogenic effects

Rslt = The result of comparing the HQ_{st} to the negligible threshold (FER if > threshold, Negl. if <= threshold)

FER = Further Evaluation Required (See Notes for thresholds)

Negl. = Negligible (See Notes for thresholds)

¹ When evaluating risk for diesel engines, use the equivalent stack height consistent with the memo dated June 10, 2009. Click here to view the "Stack Height Equivalents for Use in First Level Screening Analyses for Diesel Engines" memo.

		LONG-TERM EFFECTS										SHORT-TERM EFFECTS				
	H A P	CAS No.	Air Toxic	Q (ton/yr)	C (ug/m ³)	URF [(ug/m ³) ⁻¹]	IR	Rslt	RfC (ug/m ³)	HQ	Rslt	Q _h (lb/hr)	C _{st} (ug/m ³)	RfC _{st} (ug/m ³)	HQ _{st}	Rslt
1	*	75070	Acetaldehyde			2.2E-06			9					470		
2	*	60355	Acetamide			2.0E-05										
3		67641	Acetone						31000					62000		
4		75865	Acetone cyanohydrin						2							
5	*	75058	Acetonitrile						60							
6	*	98867	Aroclor 1248						0.02							

The Technical Guidance document, Risk Screening Workbook, and additional resources can be found online at: <https://www.phila.gov/documents/air-management-guidelines-and-regulations/>

Risk Assessment as Part of Pre-construction Permit and Title V Operating Permit Processes

- Applications satisfy Notification Requirement
- Applications include Potential HAP Emissions for new or modified sources.
- If the Potential Emission of any HAP is above a Reporting Threshold, a Risk Assessment is required.
- Cannot approve an application if it is above a certain risk level.
- Plan Approval / Title V: review existing air toxics concentrations and risks in neighborhoods surrounding the emission source at issue prior to permit approval

Facility-wide Risk Assessment

- Consists of a refined modeling analysis that includes all source operations of the facility
- Applies to Title V facilities
- Risk Guidelines for each HAP emitted **by all sources**:
 - Cancer Risk ≤ 10 in a million (1×10^{-5}) AND Non-cancer HQ ≤ 1 : Negligible
 - Otherwise, Case-by-case review or permit application unacceptable

Summary of AMR VI Cancer and Non- Cancer Risk Requirements

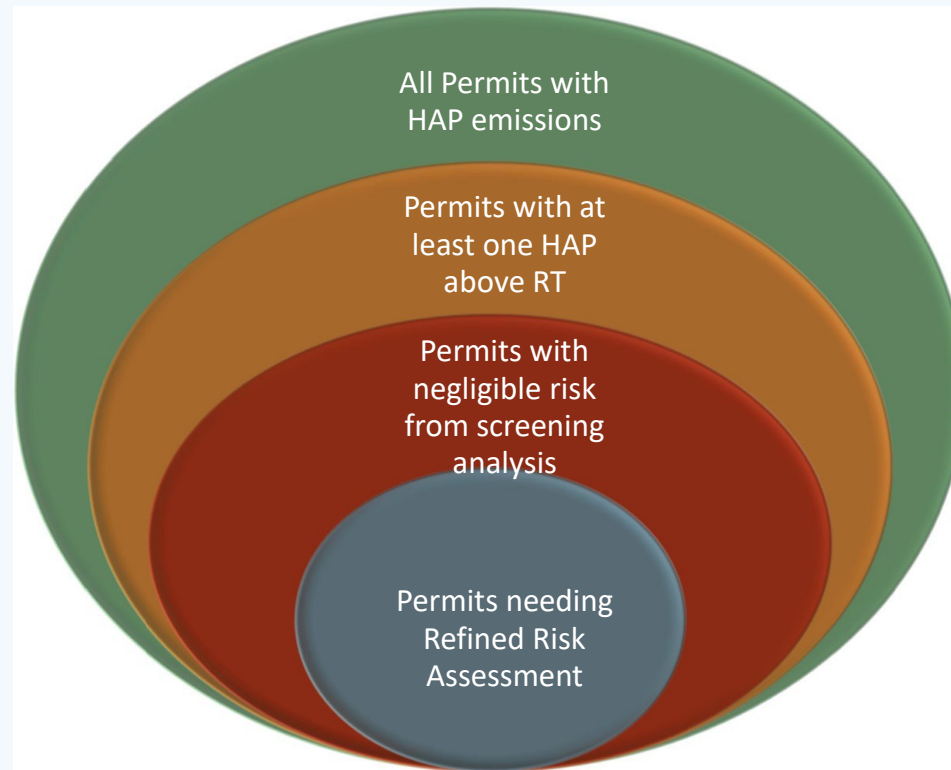
**Assumes risk is “negligible” at these
levels for a single HAP:**

**Cancer Health Risk Benchmark:
1 in a million**

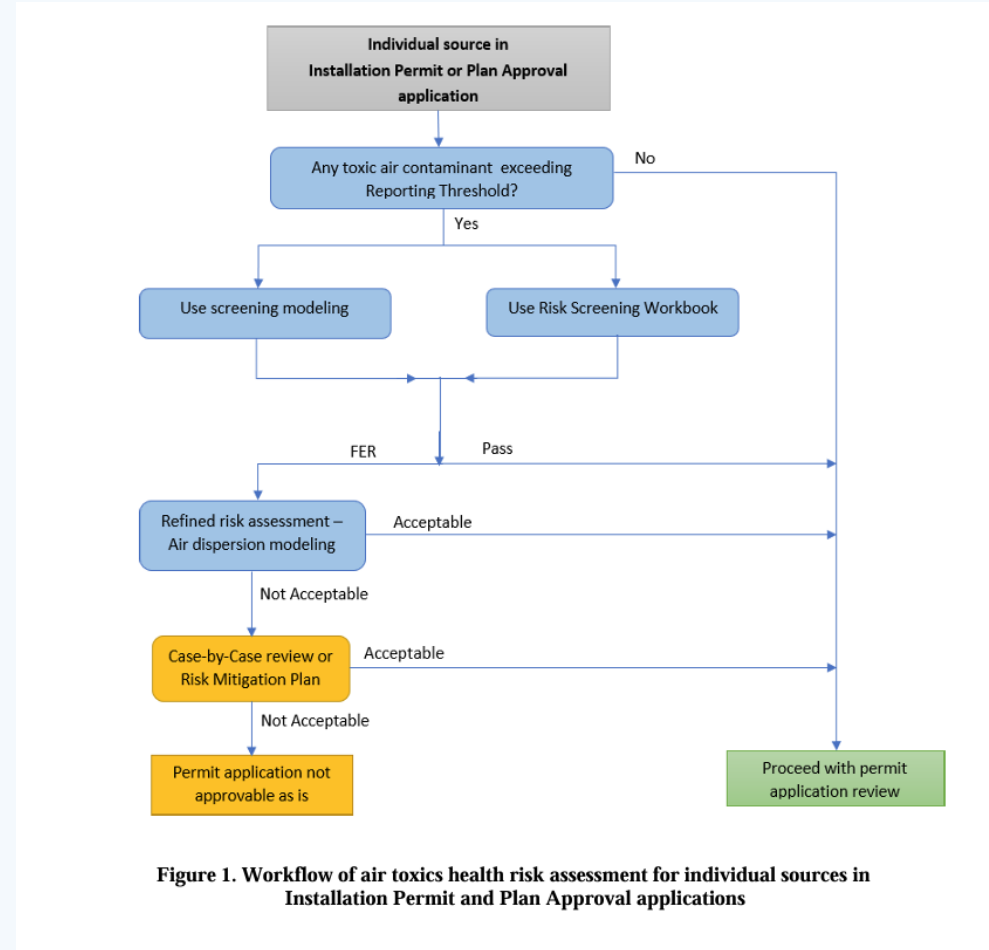
**Non-Cancer Health Risk Benchmark:
Hazard Quotient (HQ) = 1**

Permit Type	Risk Type	Risk Level	Risk Interpretation	Outcome
Installation Permits or Plan Approvals	Cancer	Risk $\leq$ 1 in a million	Of one million people exposed to the TAC, one or fewer may develop cancer.	Negligible risk.
		1 in a million < Risk < 50 in a million	Of one million people exposed to the TAC, between 2 and 49 may develop cancer.	Case-by-case review.
		Risk $\geq$ 50 in a million	Of one million people exposed to the TAC, 50 or more may develop cancer.	Unacceptable risk.
	Non-Cancer	Hazard Quotient $\leq$ 1	TAC exposure is unlikely to lead to non-cancer health impacts.	Negligible risk.
		Hazard Quotient > 1	TAC exposure may lead to non-cancer health impacts.	Risk Mitigation Plan required.
Title V	Cancer	Risk $\leq$ 10 in a million	Of one million people exposed to the TAC, one or fewer may develop cancer.	Negligible risk.
		10 in a million < Risk < 50 in a million	Of one million people exposed to the TAC, between 11 and 49 may develop cancer.	Risk Mitigation Plan required
		Risk $\geq$ 50 in a million	Of one million people exposed to the TAC, 50 or more may develop cancer.	Unacceptable risk.
	Non-Cancer	Hazard Quotient $\leq$ 1	TAC exposure is unlikely to lead to non-cancer health impacts.	Negligible Risk.
		Hazard Quotient > 1	TAC exposure may lead to non-cancer health impacts.	Risk Mitigation Plan required.

Levels of Risk Assessment for Permit Applications Including HAPs



Summary of AMR VI Permit Process: Individual Sources in Plan Approvals or Installation Permits



Summary of AMR VI Permit Process: Title V Applications, Renewals or Modifications

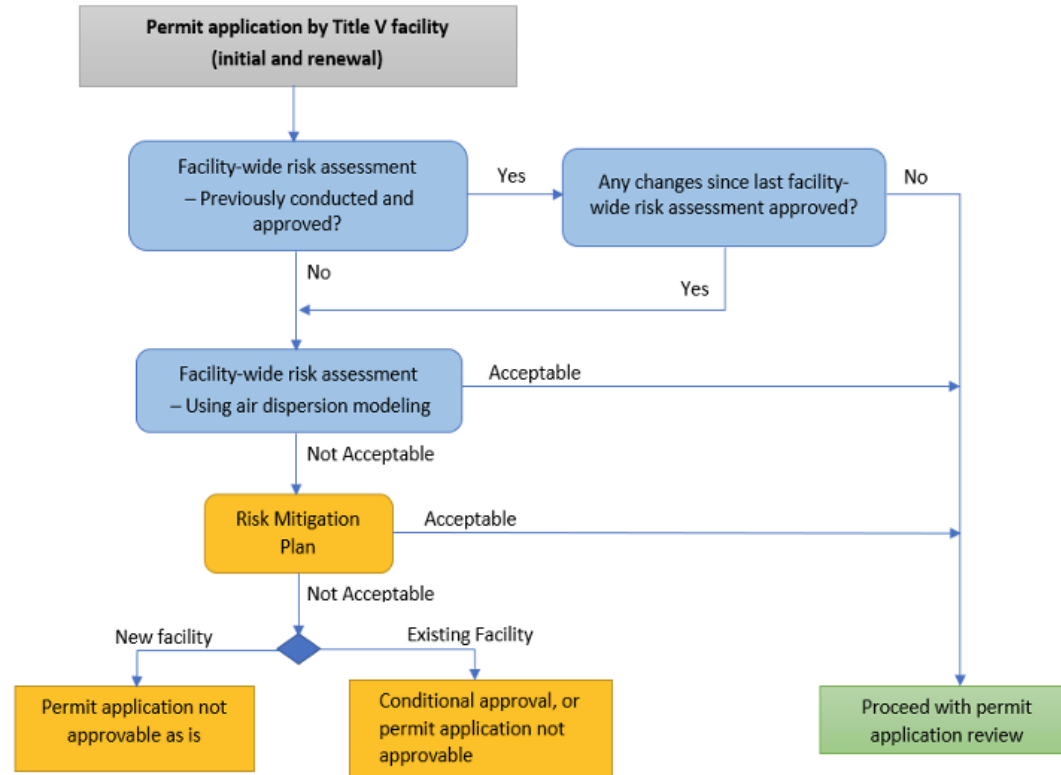


Figure 2. Workflow of facility-wide air toxics health risk assessment for Title V permit applications

Facilities Renewal Application Timeline

Renewals submitted before 2024 | Renewals in or after 2027

RENEWALS SUBMITTED BEFORE 2024

Total 8

#	FACILITY NAME	LOCATION / STREET	EXPIRATION
1	Kinder Morgan Liquids Terminals, LLC	3300 N DELAWARE AVE	10/01/2006
2	Advansix Resins & Chemicals LLC	2501 Margaret ST	10/26/2016
3	Northeast WPCP	3899 RICHMOND ST	01/27/2019
4	Naval Surface Warfare Cntr Phila Div	5001 SOUTH BROAD ST	06/13/2019
5	Rhodes Industries, Inc.	—	10/18/2024
6	MIPC, LLC	4210 G ST	06/03/2024
7	Hanwha Philly Shipyard, Inc.	2100 Kitty Hawk AVE	—
8	Energy Transfer Marketing and Terminals L.P. (ETM)	6850 Essington AVE	—

RENEWALS IN OR AFTER 2027

Total 17

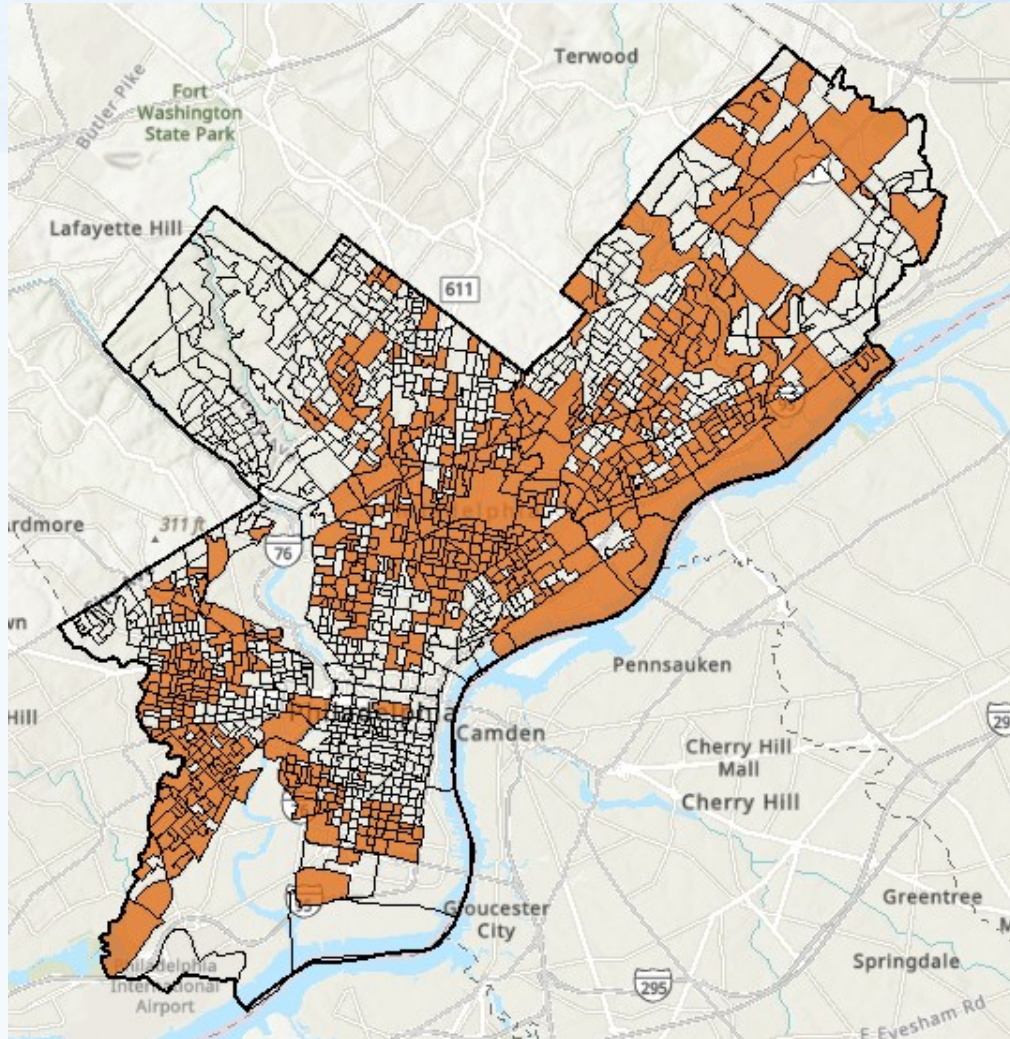
#	FACILITY NAME	LOCATION / STREET	EXPIRATION
1	Host-Schuylkill Tank Farm	3144 PASSYUNK AVE	10/07/2027
2	Temple University Main Campus, Facilities	1009 W Montgomery AVE	12/13/2027
3	Temple University Health Sciences Campus	3401 N BROAD ST	08/16/2028
4	Philadelphia Gas Works - Richmond Plant	3100 E VENANGO ST	06/20/2029
5	Constellation Energy Generation - Southwark	2501 S DELAWARE AVE	07/12/2029
6	Constellation Energy Generation - Richmond	3901 N DELAWARE AVE	03/13/2030
7	Philadelphia Prison System	8001 STATE RD	04/10/2030
8	Sun Chemical Corporation- GPI Division	3301 HUNTING PARK AVE	08/28/2030
9	Vicinity Energy - Edison	908 SANSOM ST	09/15/2030
10	The Children's Hospital of Philadelphia	34TH AND CIVIC CENTER BLVD	09/15/2030
11	Vicinity Energy Efficiency, LLC	2600 CHRISTIAN ST	09/15/2030
12	University of Pennsylvania	3451 WALNUT ST	10/31/2030
13	Constellation Energy Generation - Delaware	1325 N BEACH ST	07/15/2031
14	Constellation Energy Generation. - Schuylkill Stat	2800 CHRISTIAN ST	07/15/2031
15	Vicinity Energy - Schuylkill Station	2600 CHRISTIAN ST	08/31/2031
16	Grays Ferry Cogeneration Partnership	2600 CHRISTIAN ST	08/31/2031
17	Newman & Company	6101 TACONY ST	09/21/2031

Facilities highlighted in yellow are within 18 months of expiration and may submit renewal applications at any time.

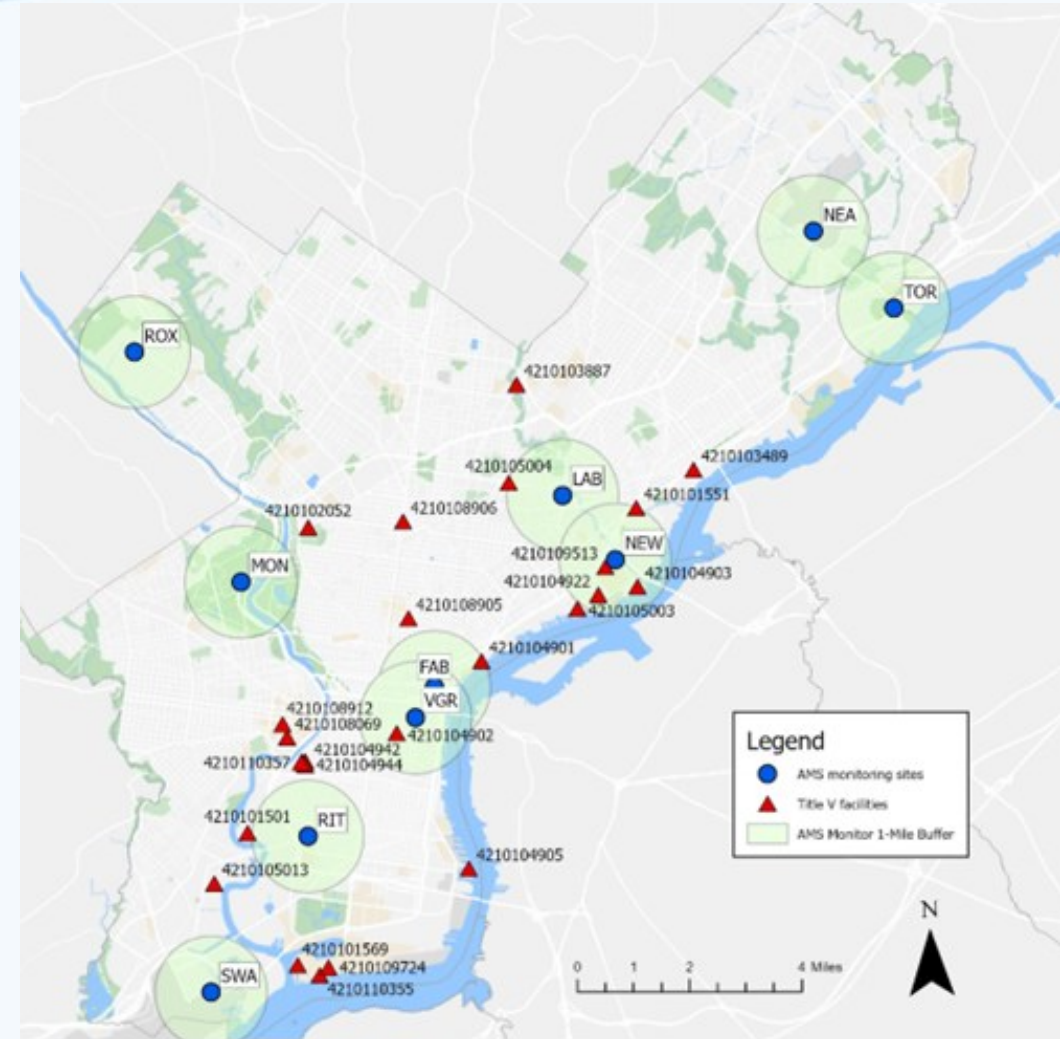
Public Health Impact of AMR VI

- Many other air toxics (e.g. hydrogen fluoride) were not listed in the compound list in the 1981 AMR VI but now would be subject to emission limits and risk assessments.
- One Big Step Forward: **1981 → 2022**
- The AMR VI amendments will effectively reduce emissions of TACs from stationary sources in Philadelphia, which will help reduce cancers, hospital admissions, long-term health care burdens, doctor visits, absences from work and school, and respiratory illnesses in children and sensitive populations, especially in Philadelphia's underserved and under-resourced communities.
- This is especially important in our poorest communities, which have borne an inequitable burden of air pollutants due to the historic concentration of polluting industries in their communities.
- AMR VI represents a significant step forward to reduce disparities and improve air quality for all Philadelphia residents and is critically important to the Philadelphia Department of Public Health's mission of protecting and promoting the health and safety of all Philadelphia residents.

Environmental Justice Communities and Title V Facilities in Philadelphia



Source: PennEnviroScreen



Source: Philadelphia AMS



INDUSTRY CONCERNS/QUESTIONS

Question # 1: There is no proven method or protocol for evaluating and measuring background air pollutant concentrations.

- AMS has used the proven EPA TO-15 methods to determine background air pollutant concentrations in Philadelphia for many years. The Technical Guidance document provides details regarding processes, and the AMS team has been working with Title V applicants on a case-by-case basis. We also use Toxics measured data from our regulatory monitors. In addition, we use our MMS mobile monitor to measure toxics concentration throughout the city.
- AMS developed a detailed sampling procedure to measure HAP concentrations in the air around the facility. The procedure will use TO-15 to sample VOCs, Picarro for Formaldehydes, and Radiello passive samples to measure Carbonyls. A risk factor for metals will be added to all background concentrations based on monitoring data at AMS regulatory monitoring sites."

Question # 2: Cumulative risk assessments and background sampling

Cumulative Risk Assessment and Background Concentration are completely different.

- Cumulative Risk Assessment is: The combination of risks posed by aggregate exposure to multiple agents or stressors, in which aggregate exposure is exposure by all routes and pathways and from all sources of each given agent or stressor. Cumulative Risk Assessment is not currently included in AMR VI.
- Rather than using cumulative risk assessment, AMS will use the total risk presented by a facility to evaluate the risk from Title V (major source) facilities:

Total Risk = Background Risk ambient air + Incremental facility risk (newly planned sources)

- Background risk calculations and data collection methods are provided in the above slide

Question # 3: The technical workbook contains errors and inconsistencies

- The industry suggested that a few HAPs have threshold inconsistencies. AMS and NJ DEP worked together on the worksheets to establish threshold limits. Both agencies obtained these limits from the EPA and California, which are based on the latest technology. AMS uses the same thresholds as NJ, since both organizations derived them from the same sources.
- We are currently updating the Risk Workbook TAC list and risk values to ensure consistency between the regulation, workbook, and technical guidance. We are continuously updating the worksheet whenever the EPA updates it. The industry provided a few minor change requests or similar adjustments that differ by a negligible amount, which we are still verifying with the EPA and CA. Because these thresholds are not permanent and change continuously based on atmospheric conditions and the latest research, AMS will update its values whenever the EPA and CA modify theirs
- In addition, the industry has other options to utilize if they do not want to use the workbook, such as the AERSCREEN EPA method.

Question # 4: Technical guideline exemptions and recommendations

- AMS included some additional exemptions in the original draft of the AMR VI amendment for:
 - Gas stations: no more than 1,900,000 gallons/year throughput
 - Internal combustion engines: no more than 2,500 HP, burning No. 2 fuel oil (including diesel), limited to 500 hrs/yr
 - Spray paint booths: no more than 250 gallons per year coatings and solvents combined, not emitting more than 21 pounds ethyl benzene per year.
 - Boilers and heaters: no more than 50 million BTU/hour, burning natural gas, exhaust stack at least 20-foot tall, at least 10 feet away from property line.
- However, during the public comments and hearings, the community expressed concerns and the APCB agreed. Because the regulation is final, AMS can not change it.

Q & A

