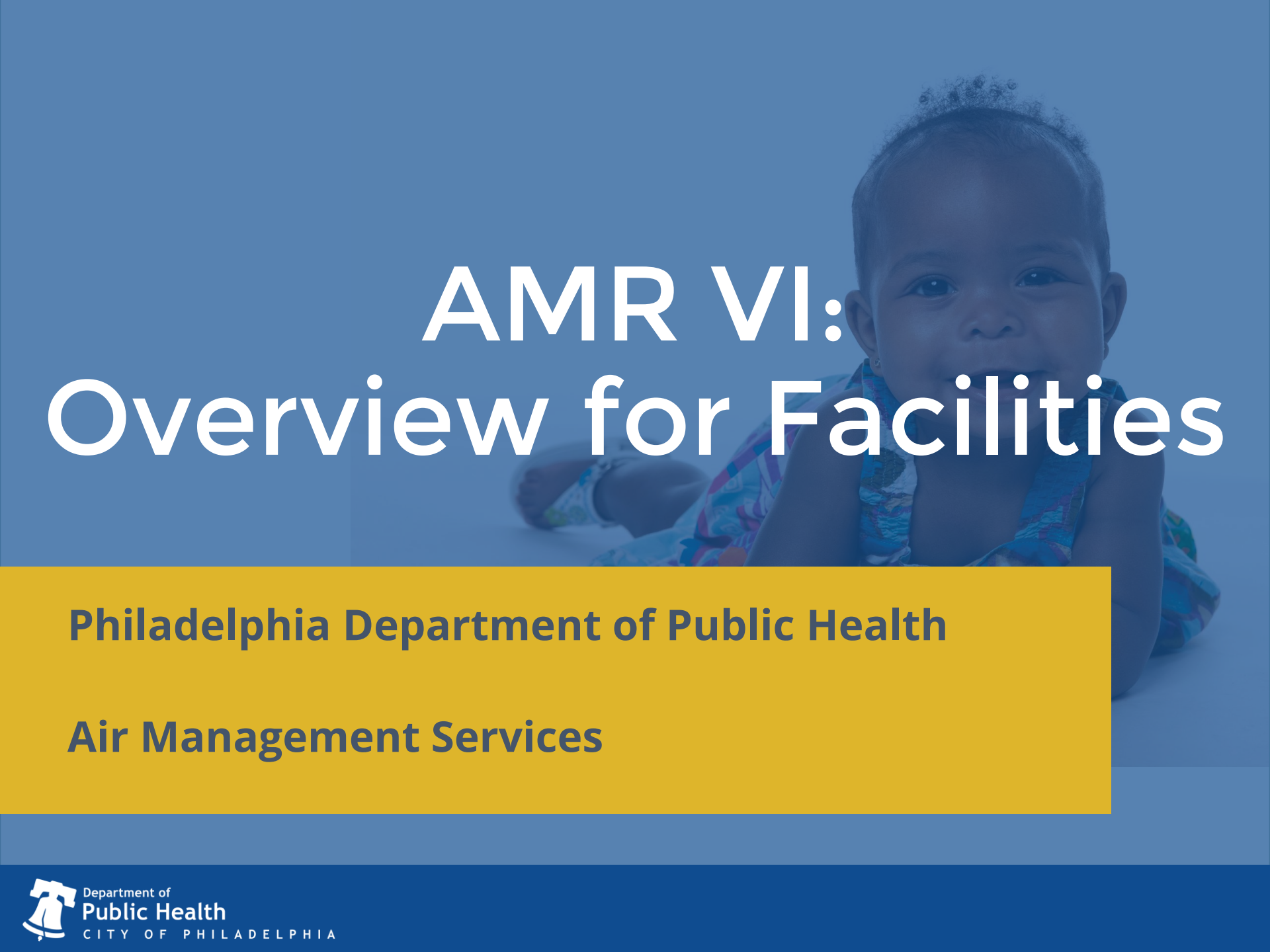


AMR VI: Overview for Facilities

Philadelphia Department of Public Health

Air Management Services

Department of Public Health
CITY OF PHILADELPHIA

AMR VI: Background

- Implemented in 2024
- Designed to reduce Toxic Air Contaminants (TACs) and improve public health
- Expands the number of TACs from 99 to 217
- Updates TAC limits based on the latest science
- Requires some facilities to estimate health risks to the surrounding community

Why is AMR VI Important?

- Reduces health burdens and costs:
  - Cancer
  - Chronic disease
  - Respiratory illness in children/sensitive groups
  - Medical costs
  - Absences from work/school
- Improves employee health and safety
- Promotes environmental justice

AMR VI for Construction Permits (New Installations and Modifications of Sources)

Installation Permits
General Plan Approvals
Plan Approvals

Step 1: Reporting Thresholds

- Compare potential source emissions to AMR VI reporting thresholds
- These can be found online in the Technical Guidelines for Air Management Regulation VI

Table 1. List of Toxic Air Contaminants (Air Toxics) and Reporting Thresholds

No.	CAS Number	Toxic Air Contaminant / HAP	Reporting Threshold (pounds/year)
1	75070	Acetaldehyde	24
2	60355	Acetamide	2.7
3	75058	Acetonitrile	2000
4	98862	Acetophenone	1
5	53963	2-Acetylaminofluorene	0.04
6	107028	Acrolein	1
7	79061	Acrylamide	0.5
8	79107	Acrylic acid	53
9	107131	Acrylonitrile	1
10	107051	Allyl chloride	9
11	92671	4-Aminobiphenyl	0.01
12	62533	Aniline	33
13	90040	o-Anisidine	1.3
14	140578	Aramite	7.5
15	1332214	Asbestos (1)	0.007
16	71432	Benzene	7
17	92875	Benzidine (4,4'-Biphenyldiamine)	0.001

Sample of reporting thresholds from the technical guidelines.

Step 1: Reporting Thresholds Continued

If no TACs exceed the reporting threshold → Done!

If any TACs exceed the threshold → Step 2

Table 1. List of Toxic Air Contaminants (Air Toxics) and Reporting Thresholds

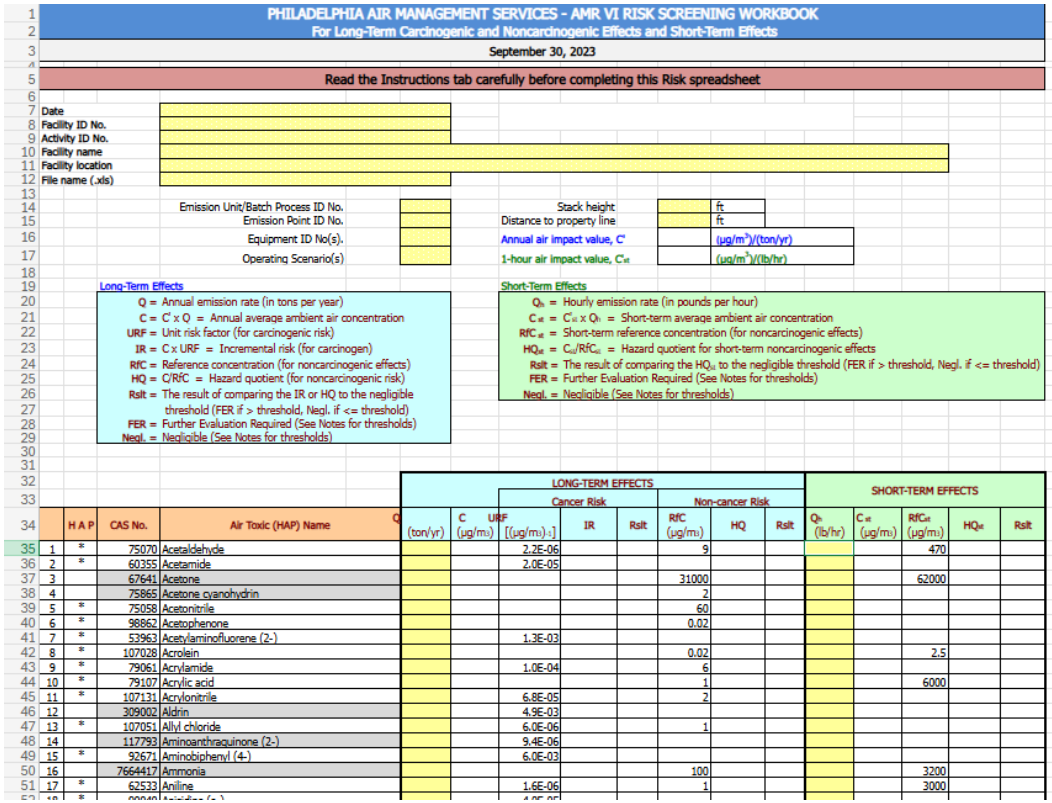
No.	CAS Number	Toxic Air Contaminant / HAP	Reporting Threshold (pounds/year)
1	75070	Acetaldehyde	24
2	60355	Acetamide	2.7
3	75058	Acetonitrile	2000
4	98862	Acetophenone	1
5	53963	2-Acetylaminofluorene	0.04
6	107028	Acrolein	1
7	79061	Acrylamide	0.5
8	79107	Acrylic acid	53
9	107131	Acrylonitrile	1
10	107051	Allyl chloride	9
11	92671	4-Aminobiphenyl	0.01
12	62533	Aniline	33
13	90040	o-Anisidine	1.3
14	140578	Aramite	7.5
15	1332214	Asbestos (1)	0.007
16	71432	Benzene	7
17	92875	Benzidine (4,4'-Biphenyldiamine)	0.001

Sample of reporting thresholds from the technical guidelines.

Step 2: Risk Screening

- Assess cancer & non-cancer risks for **each exhaust stack or emissions point** using AMS's Risk Screening Workbook **or** AERSCREEN (EPA Model)

- The AMS Workbook can be downloaded from our website



PHILADELPHIA AIR MANAGEMENT SERVICES - AMR VI RISK SCREENING WORKBOOK
For Long-Term Carcinogenic and Noncarcinogenic Effects and Short-Term Effects

September 30, 2023

Read the Instructions tab carefully before completing this Risk spreadsheet

Date
Facility ID No.
Activity ID No.
Facility name
Facility location
File name (.xls)

Emission Unit/Batch Process ID No.
Emission Point ID No.
Equipment ID No(s).
Operating Scenario(s)

Stack height ft
Distance to property line ft
Annual air impact value, C' (µg/m³)/(ton/yr)
1-hour air impact value, C'st (µg/m³)/(lb/hr)

Long-Term Effects
Q = Annual emission rate (in tons per year)
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)

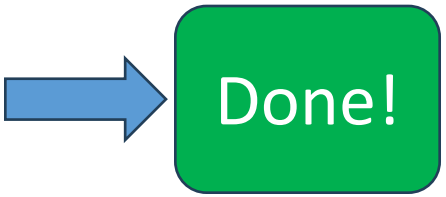
Short-Term Effects
Q_h = Hourly emission rate (in pounds per hour)
C_{st} = $C'_{st} \times Q_h$ = Short-term average ambient air concentration
RfC_{st} = Short-term reference concentration (for noncarcinogenic effects)
HQ_{st} = C_{st}/RfC_{st} = Hazard quotient for short-term noncarcinogenic effects
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)

		HAP	CAS No.	Air Toxic (HAP) Name	LONG-TERM EFFECTS: Q (ton/yr)	C (µg/m³)	Cancer Risk: URF [(µg/m³)⁻¹]	Cancer Risk: IR	Cancer Risk: Rslt	Non-cancer Risk: RfC (µg/m³)	Non-cancer Risk: HQ	Non-cancer Risk: Rslt	SHORT-TERM EFFECTS: Q_h (lb/hr)	C_{st} (µg/m³)	RfC_{st} (µg/m³)	HQ_{st}	Rslt
1	1	*	75070	Acetaldehyde			2.2E-06			9					470		
2	2	*	60355	Acetamide			2.0E-05										
3	3		67641	Acetone						31000					62000		
4	4		75865	Acetone cyanohydrin						2							
5	5	*	75058	Acetonitrile						60							
6	6	*	98862	Acetophenone						0.02							
7	7	*	53963	Acetylaminofluorene (2-)			1.3E-03										
8	8	*	107028	Acrolein						0.02					2.5		
9	9	*	79061	Acrylamide			1.0E-04			6							
10	10	*	79107	Acrylic acid						1					6000		
11	11	*	107131	Acrylonitrile			6.8E-05			2							
12	12		309002	Aldrin			4.9E-03										
13	13	*	107051	Allyl chloride			6.0E-06			1							
14	14		117793	Aminoanthraquinone (2-)			9.4E-06										
15	15	*	92671	Aminobiphenyl (4-)			6.0E-03										
16	16		7664417	Ammonia						100					3200		
17	17	*	62533	Aniline			1.6E-06			1					3000		

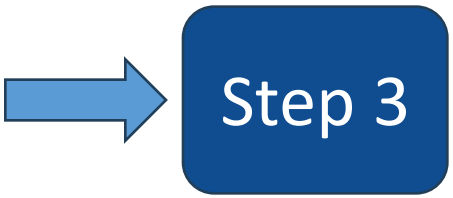
Sample of the AMS Risk Screening Workbook

Step 2: Risk Screening Continued

- If all TACs are “Negl” (negligible)



- If any TACs receive “FER” (further evaluation required)



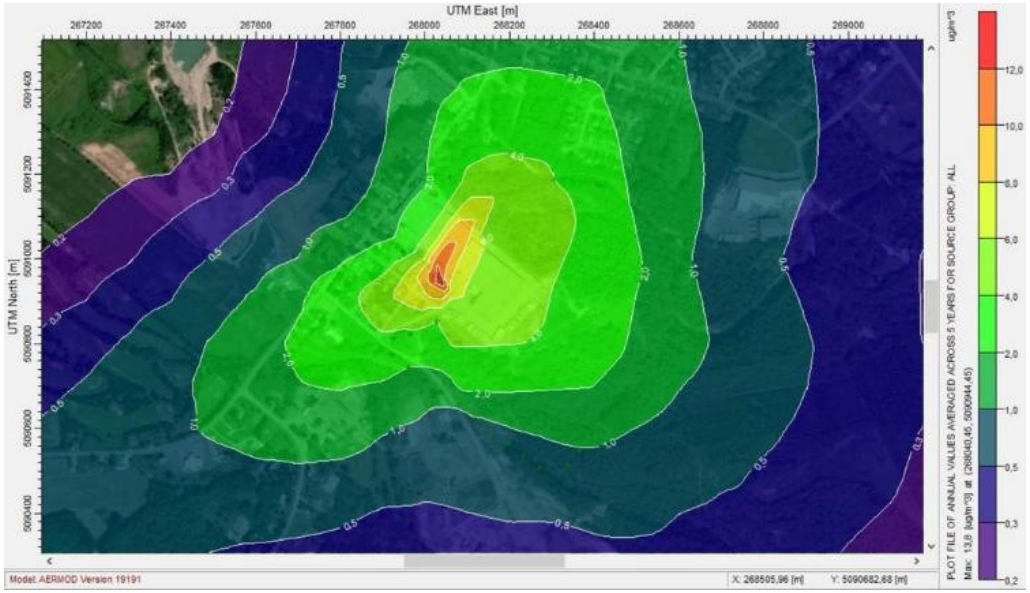
Arsenic (inorganic)			4.3E-03		
Arsine					
Asbestos			7.7E-03		
Azobenzene			3.1E-05		
Barium					
Benzene	1.0E+01	3.3E+02	7.8E-06	**2.6E-03**	**FER**
Benzidine			6.7E-02		
Benzo(a)pyrene			6.0E-04		
Benzotrichloride			3.7E-03		
Benzyl chloride			4.9E-05		
Beryllium			2.4E-03		
Biphenyl (1,1-)					
Bis(2-chloroisopropyl)ether			1.0E-05		

Example of “FER” result in the AMS Screening Workbook

*Only input TACs above the reporting threshold (Step 1)

Step 3: Refined Risk Assessment

- Conduct a refined risk assessment using AERMOD
  - AERMOD instructions can be found on the EPA's website
- AMS modeling staff will work with facilities to determine model specifications



Sample AERMOD output

Step 3: Refined Risk Assessment Continued

Permit Type	Risk Type	Risk Level	Risk Interpretation	Outcome
Installation Permits or Plan Approvals	Cancer	Risk ≤ 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.	Risk Mitigation Plan Required
		Risk ≥ 50 in a million	Of one million people exposed to the TAC, 50 or more may develop cancer.	Unacceptable risk.
	Non-cancer	Hazard Quotient ≤ 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.

Negligible risk → Done!

Above negligible risk, but below unacceptable → Step 4

Unacceptable risk → ✕

(Changes to the proposal are required)

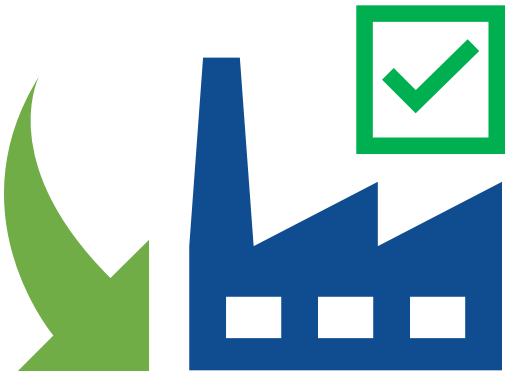
Step 4: Risk Mitigation Plan

- AMS will work with facilities on a case-by-case basis



- Mitigation strategies may include:
  - Higher stack
  - Limited operating hours
  - Additional control equipment
  - Other solutions

Step 4: Risk Mitigation Plan Continued



When AMS approves the risk mitigation plan → Done!

Summary of 2025 Construction Permits Applications

2025 AMR VI Statistics

	Total	Exempt	Sreeening Work sheet	Aerscreen	AERMOD
Air Cleaning Unit Process IP Total	11	11	0	0	0
Boiler, Warm Air Furnace, or Hot Water Heater < 10 MMBTU/hr IP Total	160	31	99	65	0
Dust Control Permit for Demolition IP Total	98	98	0	0	0
Fumigation Process IP Total	1	1	0	0	0
Gasoline Dispensing Facilities IP Total	4	2	0	2	0
Internal Combustion Engine IP < 750 KW / 1000 HP Total	104	91	8	8	0
Internal Combustion Engine IP >/= 750 KW / 1000 HP Total	12	9	1	3	0
Internal Combustion Engine IP for Portable Crusher Total	3	3	0	0	0
Misc Process IP Total	21	13	2	6	0
Parking Garage Automotive Facilities - CO Detection or Mechanical Ventilation System IP	1	1	0	0	0
Plan Approval no NSPS or NESHAP Total	8	1	4	5	1
Portable Nonmetal Processing Plant GP	2	2	0	0	0
Other	14	14	0	2	0
Total	439	277	114	91	1

Summary 2026 Q1-Q3 Construction Permits Applications

2026 AMR VI Statistics (2026 Q1, Q2, and Q3)					
Sub Type	Total	Exempt	Sreeening Work sheet	Aerscreen	AERMOD
Air Cleaning Unit Process IP Total	4	4			
Boiler, Warm Air Furnace, or Hot Water Heater < 10 MMBTU/hr IP Total	255	44	212	98	0
Dust Control Permit for Demolition IP Total	32	32	0	0	0
Gasoline Dispensing Facilities IP Total	5	1	1	3	0
Fumigation	1	1	0	0	0
Internal Combustion Engine IP < or = 745.5 KW / 1000 HP Total	91	68	22	9	0
Internal Combustion Engine IP > 745.5 KW / 1000 HP Total	7	5	3	1	0
Misc Process IP Total	11	7	2	2	0
GP Storage Tank	4	4	0	0	0
Automotive Facilities	2	2	0	0	0
Plan Approval Extension Total	7	7	0	0	0
Request for Determination -	4	4	0	0	0
Total	423	179	240	113	0
		0.42316785			

AMR VI for Title V Sources

Step 1: Reporting Thresholds

- Compare potential facility-wide emissions to AMR VI reporting thresholds
- These can be found online in the Technical Guidelines for Air Management Regulation VI

Table 1. List of Toxic Air Contaminants (Air Toxics) and Reporting Thresholds

No.	CAS Number	Toxic Air Contaminant / HAP	Reporting Threshold (pounds/year)
1	75070	Acetaldehyde	24
2	60355	Acetamide	2.7
3	75058	Acetonitrile	2000
4	98862	Acetophenone	1
5	53963	2-Acetylaminofluorene	0.04
6	107028	Acrolein	1
7	79061	Acrylamide	0.5
8	79107	Acrylic acid	53
9	107131	Acrylonitrile	1
10	107051	Allyl chloride	9
11	92671	4-Aminobiphenyl	0.01
12	62533	Aniline	33
13	90040	o-Anisidine	1.3
14	140578	Aramite	7.5
15	1332214	Asbestos (1)	0.007
16	71432	Benzene	7
17	92875	Benzidine (4,4'-Biphenyldiamine)	0.001

Sample of reporting thresholds from the technical guidelines.

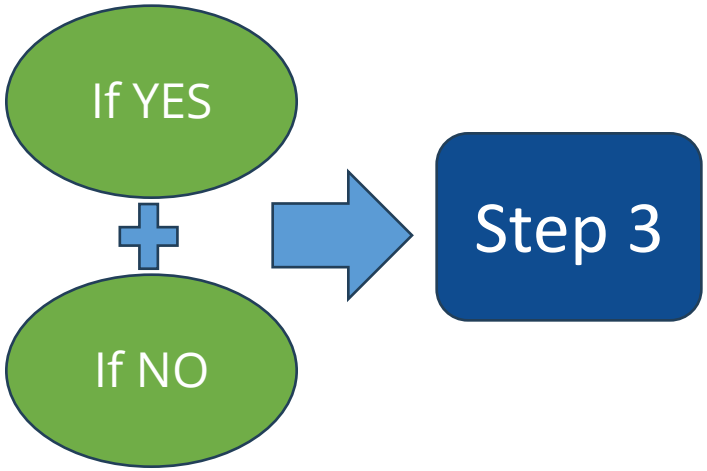
Step 1: Reporting Thresholds Continued

If no facility-wide TACs exceed the reporting threshold → Done!

If any facility-wide TACs exceed the threshold → Step 2

Step 2a: Existing Facility-Wide Risk Assessment

Has your facility already conducted a risk assessment with an AMS-approved protocol?

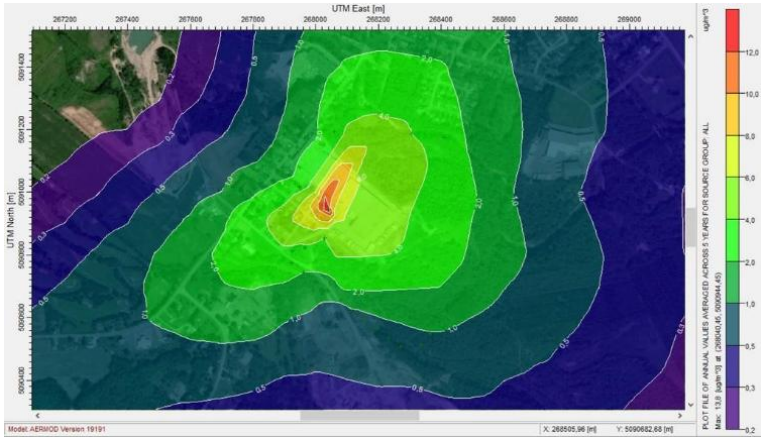


Have there been any changes since it was last approved?

All other applicants → Step 2b

Step 2b: New Facility-Wide Risk Assessment

- Conduct a refined risk assessment using AERMOD
  - AERMOD instructions can be found on the EPA's website
- A modeling protocol must be agreed upon by the permittee and AMS prior to completing the risk assessment.
- Risks from each TAC will be assessed separately.



Sample AERMOD output

Step 2b: New Facility-Wide Risk Assessment Continued

Permit Type	Risk Type	Risk Level	Risk Interpretation	Outcome
Title V	Cancer	Risk ≤ 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 ≥ 50 in a million	Of one million people exposed to the TAC, 50 or more may develop cancer.	Unacceptable risk.
	Non-cancer	Hazard Quotient ≤ 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.

Negligible risk → Step 3

Above negligible risk, but below unacceptable → Step 2c

Unacceptable risk → 

(Changes to the proposal are required)

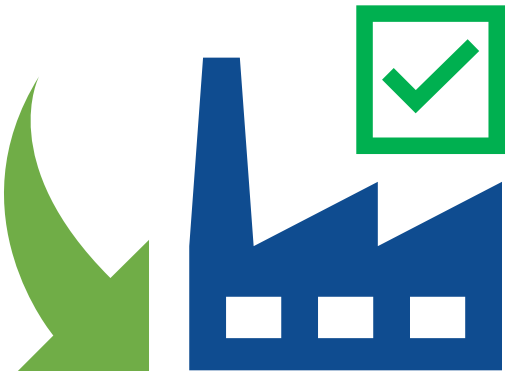
Step 2c: Risk Mitigation Plan

- AMS will work with facilities on a case-by-case basis



- Mitigation strategies may include:
  - Higher stack
  - Limited operating hours
  - Additional control equipment
  - Other solutions

Step 2c: Risk Mitigation Plan Continued



When AMS approves the risk mitigation plan → Step 3

Step 3: Total Risk Assessment

Total Risk = Background Risk + Incremental Risk

- **Background Risk:** AMS will sample the ambient air around the facility for TACs to account for TAC risks from current emission sources
  - If the facility has no proposed emission sources, then the Total Risk is calculated from the ambient air samples
- **Incremental Risk:** If the facility has planned emission sources that are not operating, AERMOD will be used to estimate TAC impacts from those sources

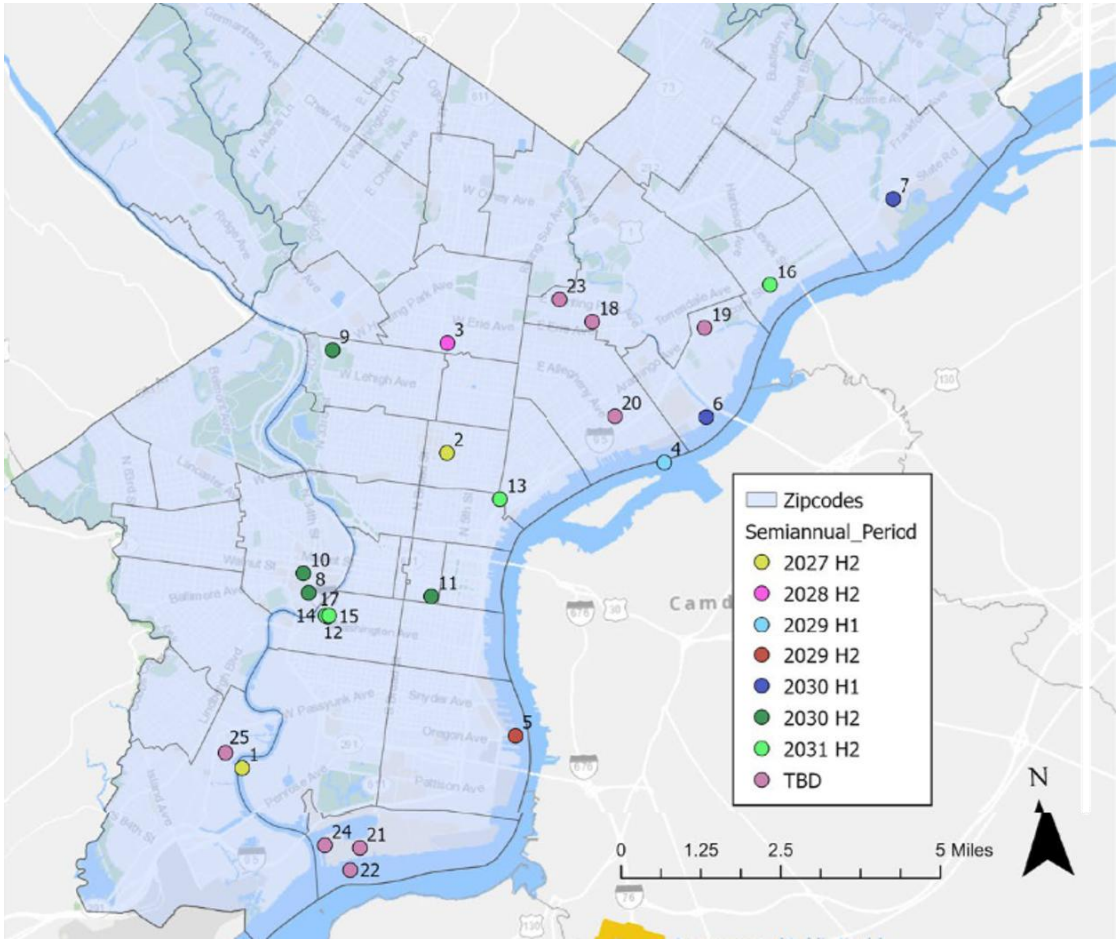
For more on the method for establishing background risk, view:
AMR VI Background and Total Risk Procedure and Clarification

Step 3: Total Risk Assessment Continued

If total cancer risk is below 100 in a million → Done

If total cancer risk is above 100 in a million → Case-by-Case Risk Mitigation

Title V Facility Locations



Upcoming Title V Renewals



Renewals submitted before 2024 | Renewals in or after 2027 • Sorted by expiration date

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.

Thank you!

Please contact:

Maryjoy Ulatowski
Chief of Source Registration
Air Management Services
Maryjoy.Ulatowski@phila.gov

with any questions

Department of Public Health
CITY OF PHILADELPHIA

Visit PDPH's YouTube page to watch the video summary