



# **Screening Methodologies to Support Risk and Technology Reviews: A Case Study Analysis**

SAB Panel Meeting

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# Overview

- Risk and Technology Review (RTR) Background
- Evolution of RTR Risk Screen/Assessment Methods
- Previous SAB reviews
- Risk Screens and Assessments Conducted for RTRs
- Focus of this Review
  - Multipathway Screen (CQ1 to CQ5)
  - Environmental Risk Screen (CQ6)
  - Chronic Inhalation Assessment – Cancer and Noncancer (CQ7, CQ8)
  - Acute Inhalation Screen and Refined Assessment (CQ7, CQ8)



# RTR Statutory Requirements

- Risk and Technology Review program is part of a Clean Air Act mandate to manage hazardous air pollutant (HAP) emissions from industrial sources
  - Follows after completion of CAA section 112(d) requirements for EPA to issue technology-based standards under the National Emissions Standards for Hazardous Air Pollutants (NESHAP) program
- Technology-based Standards
  - Standards must be based on “Maximum Achievable Control Technology”
  - Required for ‘major’ sources (e.g., Petroleum refineries, large dry cleaners)
  - Program largely completed
- Residual Risk
  - 8 years after promulgation of MACT standards assess risks that remain
  - Set additional standards if MACT does not protect public health with an “ample margin of safety”
  - Set additional standards if necessary to prevent adverse environmental effects
  - Program ongoing



# RTR Statutory Requirements (cont.)

- Technology Review
  - Evaluate whether advances in technology support adoption of newer, cost-effective pollution controls-- to be conducted every 8 years for each major source MACT standard
  - Take into account developments in practices, processes, and control technologies
  - Revise standards as necessary
  - Program ongoing
- Since the first technology review coincides with residual risk review, we combine them into one “RTR” rulemaking.



# Residual Risk Decision Framework

Step 1: Determine “acceptable risk” considering all health information and uncertainty

- Cancer risk: 100-in-1 million maximum individual risk (MIR) is ordinarily the upper end of the range of acceptability
- Not a bright line. Also look at cancer incidence, persons within various risk ranges, uncertainties, etc.
- Also consider chronic noncancer, acute, and multipathway risks



## Residual Risk Decision Framework (cont.)

Step 2: Set standard to provide “ample margin of safety”, considering health information again along with other relevant factors (cost, feasibility of control, etc.)

- If risks are less than or equal to 1-in-1 million = “presumptive” ample margin of safety
- If risks > 1-in-1 million, consider all health information again, along with costs, technological feasibility, uncertainties, and other relevant factors
- Potential for adverse environmental effects weighed here



# Status of RTR Program

- EPA has issued MACT standards for more than 180 industrial source categories
- RTRs required for 118 source categories.
- 56 RTRs completed
- 62 RTRs to be done

Number of Categories	Proposal Date	Final Date
2	Completed	Oct 2017
7	Dec 2018	Feb 2018
20	April 2019	March 2020
6	July 2019	June 2020
9	TBD	TBD



# RTR Risk Assessment Regulatory Process Overview





# Evolution of RTR Risk Screen/Assessment Methods

<b>Drivers for Change</b>	<b>Examples</b>
SAB Reviews	The environmental risk screen now compares modeled environmental concentrations to ecological benchmarks - it no longer uses human health thresholds as a pre-screen.
Public Comments	Census block centroids may not represent the individual closest to the facility. EPA has developed a new census block tool to identify when centroids may not represent population locations. Centroids are either moved or new receptors are added to reflect populations.
Data, Model, and Scientific Advancements	Human exposure model (HEM) is continually updated to incorporate the latest: AERMOD, census and meteorological data, health benchmarks.



# Previous SAB Reviews of RTR Methods

- Since components of our screens and assessments evolve over time, we periodically seek SAB review
- Each subsequent review builds on the previous reviews; therefore, each review is focused on the changes since the last review

Year	Review Focus
1998	SAB reviewed the Draft Residual Risk Report to Congress, which described the analytical and policy approach for assessing residual risk from hazardous air pollutants emitted from stationary sources.
2000	SAB reviewed whether EPA's overall approach to assessing residual risk in the Secondary Lead Source Category was consistent with the methods described in the Residual Risk Report to Congress.
2006	EPA consulted with the SAB on development of emissions inventories for source categories and updated methods for characterizing human exposure and risks.
2009/ 2010	SAB reviewed updated and expanded air toxics risk assessment methodologies—including updated techniques for multipathway assessments using the Total Risk Integration Model (TRIM), refined screening methods for acute risk, and methods for assessing potential environmental risk.



# Risk Screens and Assessments Conducted for RTRs

Multipathway  
Screen  
(CQ1-5)

Chronic Inhalation  
Assessment  
- Cancer  
- Noncancer  
(CQ7 & 8)

Environmental  
Risk Screen (CQ6)  
- PB-HAP  
- Acid Gases

Acute Inhalation  
Screen and  
Refined  
Assessment  
(CQ7 & 8)



# RTR Models

Model	Description	Analyses
TRIM.FaTE <sup>1</sup>	<ul style="list-style-type: none"> <li>• Models fate and transport of air emissions of persistent and bioaccumulative HAPs</li> <li>• Includes chemical partitioning into soil, water, and other environmental media (e.g., fish)</li> </ul>	<ul style="list-style-type: none"> <li>• Multipathway Screen</li> <li>• Environmental Risk Screen for PB-HAP</li> </ul>
Human Exposure Model (HEM3)	Contains: <ul style="list-style-type: none"> <li>• AERMOD dispersion model</li> <li>• Census data</li> <li>• Terrain elevation data</li> <li>• Meteorological data</li> <li>• Health values</li> </ul>	<ul style="list-style-type: none"> <li>• Inhalation Assessments               <ul style="list-style-type: none"> <li>• Cancer</li> <li>• Noncancer</li> </ul> </li> <li>• Acute Screen</li> <li>• Environmental Risk Screen for HF and HCl</li> </ul>

1 – Total Risk Integration Methodology (TRIM).  
 Fate, Transport, and Ecological Exposure Model (FaTE)

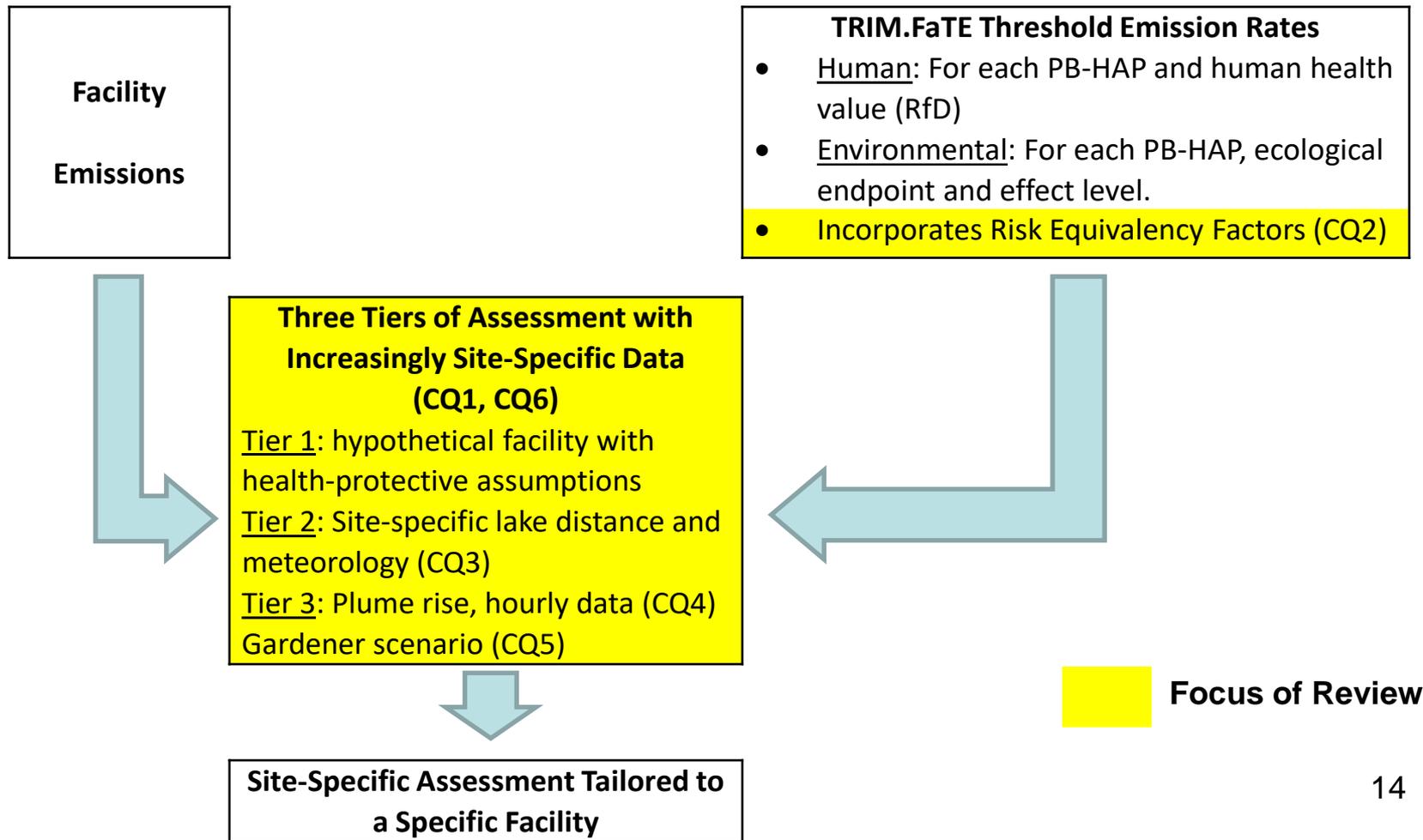


# Focus of this Review

- Multipathway Screen (CQ1)
  - Use of risk equivalency factors for Dioxins and POM (CQ2)
  - Tier 2 and Tier 3 that replace some of the health-protective assumptions in Tier 1 with more site-specific info (CQ3, CQ4)
  - Possible addition of a gardener scenario (CQ5)
- Environmental Risk Screen (CQ6)
- Inhalation Assessment Tools
  - Urban/Rural enhancement (CQ7)
  - Census block receptor tool (CQ8)

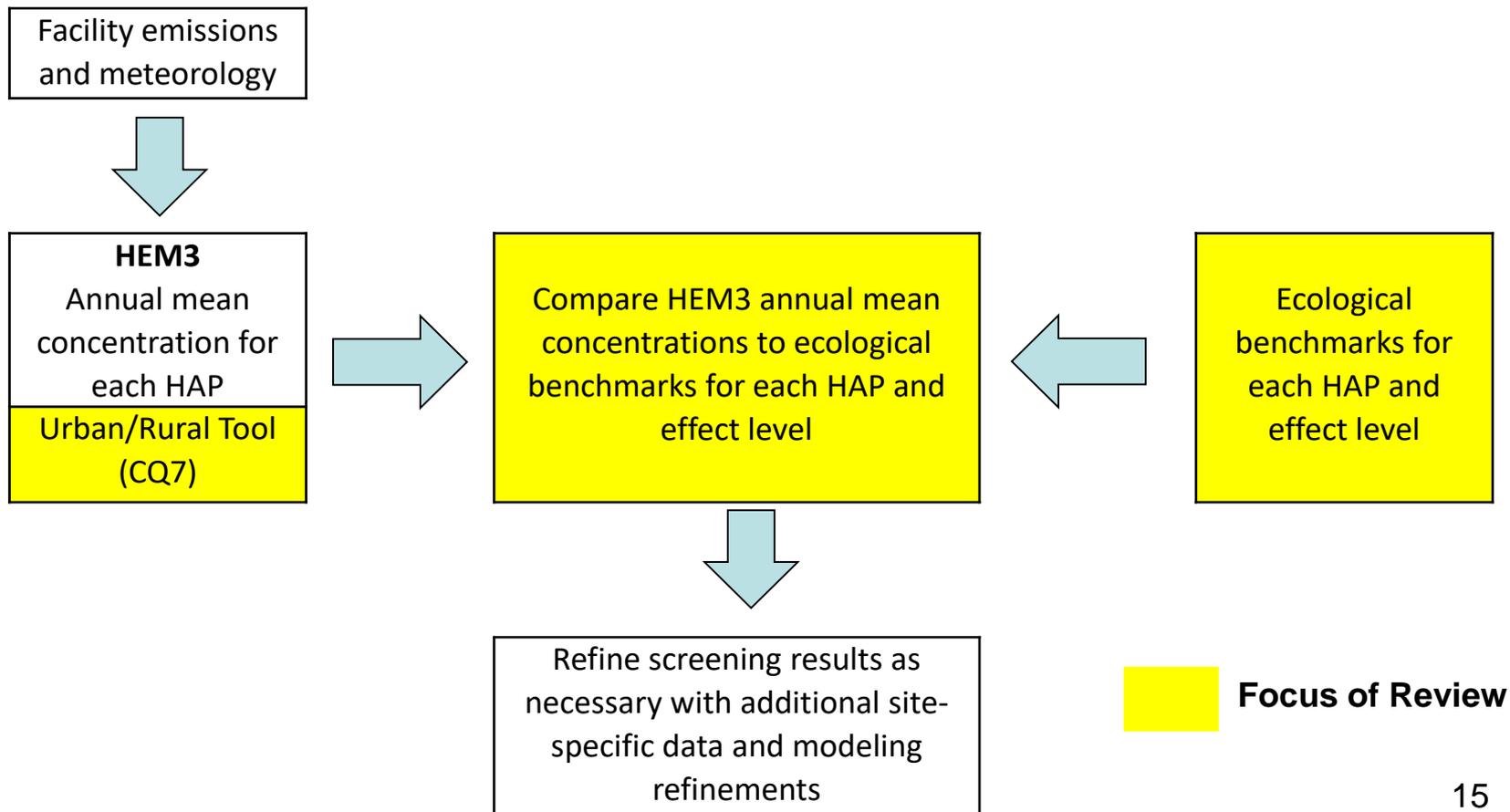


# Multipathway and Environmental Risk Screens: PB-HAP





# Environmental Risk Screen: Acid Gases (CQ6)





# Charge Question 1

## Multipathway Risk Screen - Overall

- Does the three-tiered screening approach appropriately eliminate facilities unlikely to have appreciable multipathway risk and identify those where additional multipathway analysis may be warranted?
- Any specific suggestions for improvement of the multipathway risk screening methodology?



## Charge Question 2

### Multipathway Risk Screen – Equivalency Factors

- Does the risk equivalency factor methodology appropriately account for differences in the environmental fate and transport among polycyclic organic matter (POM) and dioxin congeners?



## Charge Question 3

### Multipathway Risk Screen – Tier 2 Assumptions

- Are the following assumptions made in Tier 2 of the multipathway screen appropriate?
  - Human fishing behavior assumptions used in the refined fisher scenario
  - Assumptions about PB-HAP deposition to lakes
  - Assumptions about the ability of ponds and lakes to sustain populations of fish



## Charge Question 4

### Multipathway Risk Screen – Tier 3 Methods

- Are the methods used in Tier 3 of the multipathway screen appropriate for evaluations of (1) lake data, (2) plume rise, and (3) time-series meteorological and time-series plume-rise data?



# Charge Question 5

## Multipathway Risk Screen – Gardener Scenario

- Are the assumptions and approaches laid out for application in the gardener scenario appropriate?
- Does adding the gardener scenario improve our ability to characterize ingestion risks for urban and rural environments?



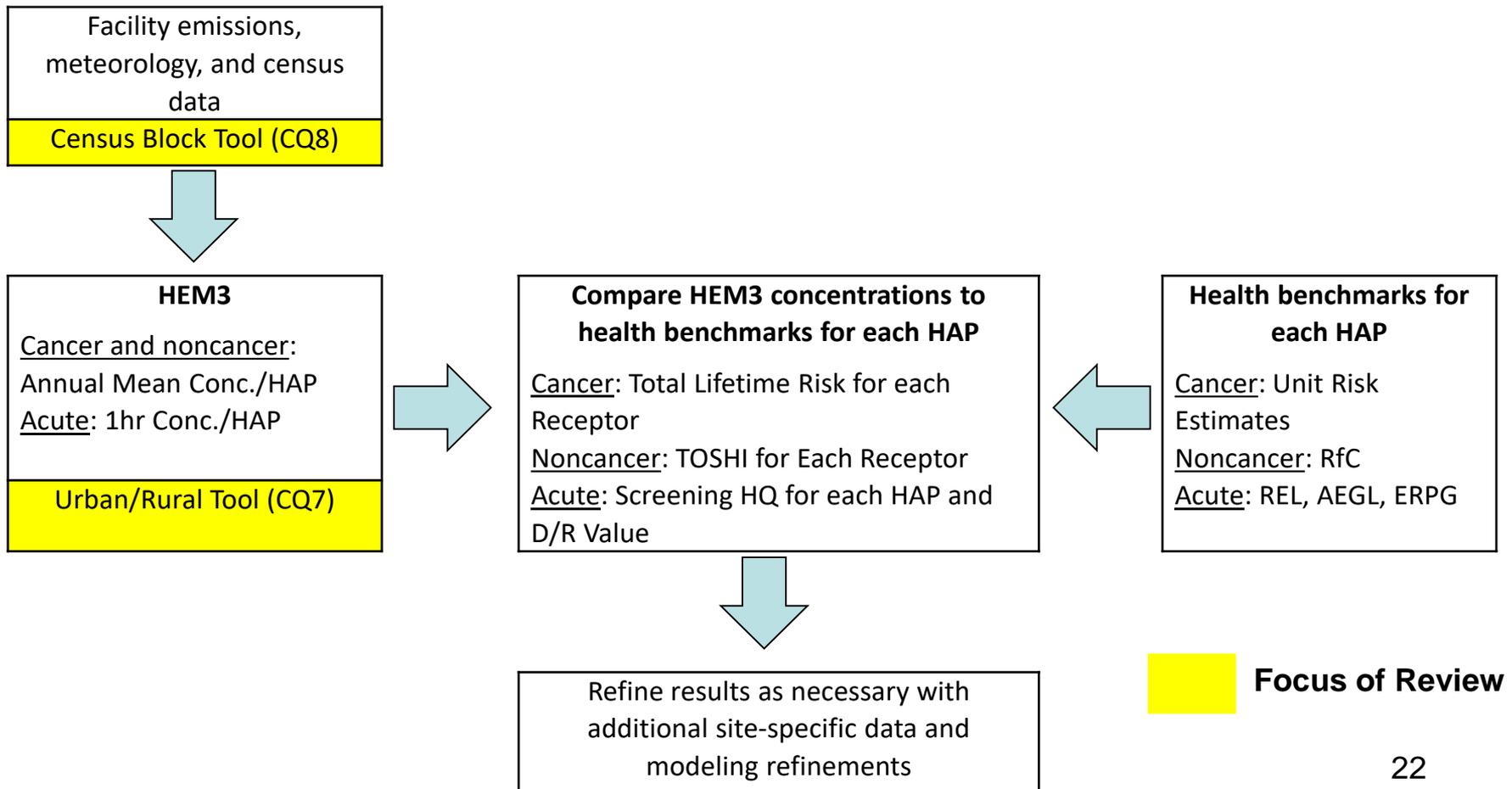
# Charge Question 6

## Environmental Risk Screen

- Is the environmental risk screen appropriate for identifying facilities that may have the potential to cause adverse environmental effects?
  - Specifically, are the pollutants, ecological assessment endpoints, and benchmarks used appropriate?
  - Any specific suggestions for improvement of the environmental risk screen methodology?



# Inhalation: Cancer and Noncancer Assessments and Acute Screen





## Charge Question 7

### Inhalation Risk Assessment – Urban/Rural Tool

- Is the Urban/Rural Dispersion Selection Enhancement Tool an appropriate procedure for identifying facilities to be modeled using the urban option in AERMOD?



## Charge Question 8

### Inhalation Risk Assessment – Census Block Tool

- Is the Census Block Receptor Check Tool an appropriate method for identifying and adjusting model receptors to ensure the receptors are representative of residential locations?



## And Finally, thank you...

- ...for your interest and efforts in helping EPA develop the highest-quality RTR assessments possible
- We look forward to discussing our screening methods and hearing your recommendations