Perimeter Air Monitoring Technical Guidance Training Day 1 of 2

January 23, 2024 1-4pm

Contaminated Site Remediation & Redevelopment (CSRR)

Moderators

Alissa Ambacher

Co-Moderator
DEP/CSRR Training Committee

Diane Hagmann

Co-Moderator
DEP/CSRR Training Committee

Continuing Education Credits

Site Remediation Professional Licensing (SRPL) Board

has approved

2.5 Technical CECs

for this Training Session

Attendance Requirements:

- **Webinar participants**: must be logged-in for the entire session and answer all poll questions (randomly inserted in the presentation)

CECs: What's the Process?

Since the SRPL Board has approved CECs for the course:

- NJDEP compiles a list of "webinar" participants eligible for CECs and provides the list to the Licensed Site Remediation Professional Association (LSRPA)
- LSRPA will email eligible participants a link to an LSRPA webpage with certificate access instructions
- Certificates are issued by the LSRPA after paying a *$25 processing fee*

Test Your Knowledge

EXAMPLE WEBINAR QUIZ SLIDE

Test Poll

EXAMPLE WEBINAR QUIZ SLIDE

Why are you here today?

A. Earn CECs
B. Learn more about ECCC
C. Learn more about CSRR

Remember!

Day 2 of the Perimeter Air Monitoring (PAM) training will be held tomorrow,

January 24th, 2024 from 9am- 12pm

You must register for day 2 separate from today's training!

To Register for day 2:

https://attendee.gotowebinar.com/register/6565538406766491742

Please fill out the Course Evaluation here:

https://www.surveymonkey.com/r/RNRCJPK

Communication

Question Function

- Please use the **questions function** to ask any questions you may have for the presenters at any time during the presentation. These will be addressed during the questions segments.
- If a question isn't addressed during a question segment of the presentation, it will be answered after the presentation.
- In order for a question to be answered live, the question must not be case specific and must be relatively short.

Chat Function

- Please use the **chat function** to advise the Department of technical issues with the presentation.
- Please do not use the chat function to comment on presentations, to ask questions, or to answer other attendees' questions.

Your Job in this Training

- Participate!
- Complete polls
- Provide feedback

January 23 - 24, 2024

NJDEP Perimeter Air Monitoring Guidance Training

Credits
2.5 Technical Credits for Day One and
2.5 Technical Credits for Day Two
(Course # 2024-003)

NJ Licensed Site Remediation Professionals Association

Thank You to Our Annual Partners

Diamond Partners

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UPCOMING LSRPA COURSES & EVENTS

- **Aspiring Professionals Series: Understanding Risks and Liabilities**
  - **January 25, 2024 - Session I – LSRP Third-Party Reliance & LSRP Liability**
  - **February 1, 2024 - Session II – Risk Management/Insurance**
  - **February 15, 2024 - Session III – LSRPs Practitioner's Perspective**

- **February 13, 2024 – LSRPA Virtual Regulatory Roundtable**

  Mitigating Delays Due to Offsite Access

  Instructors: Jordan M. Asch, Esq., Riker Danzig
  Alexander J. Saltzman, LSRP, French & Parrello
  William Lindner, Director- Environmental Services, NJ Natural Gas Company
  Moderator: Ken Haduch, LSRP, ERM

- **February 15, 2024 – NJ Site Remediation Professional Licensing Board Rule Updates**

  Instructors: Kathi Stetser, LSRP, GEI Consultants, Inc.
  Joann Held, NJSRPL Board Member
  Joanne Vos, Esq., Maraziti Falcon, LLP

- **February 29, 2024 – NJDEP Field Sampling Procedures Manual Training**

Visit LSRPA.org for details and registration

UPCOMING LSRPA COURSES & EVENTS

- **March 12, 2024 – LSRPA Virtual Regulatory Roundtable**

  Unmanned Aerial Systems (UAS) Applications for Environmental Assessments, Due Diligence & Remediation Planning

  Instructors: James J. Heiser, President, DPK Consulting
  Golky Barrios, UAS Operations Manager, DPK Consulting
  Moderator: Kassidy Klink, PG LSRP, Nova Group, GBC, Peak Environmental Division

- **March 19, 2024 – Remediation Funding Source and Financial Assurance Training for Environmental Practitioners**

  Instructors: Jennifer MacLeod, NJDEP, Remediation Funding Source Coordinator
  Vincent Fasanella, NJDEP, Financial Assurance Coordinator
  Christopher Venezia, LSRP, ESA Environmental Consultant

- **April 16 & 18, 2024 – LSRPA Hazardous Waste Operations and Emergency Response 8 Hour Refresher Training**

  Instructor: David Sweeney, LSRPA, Assistant Executive Director

Visit LSRPA.org for details and registration


NEW JERSEY
SITE REMEDIATION
CONFERENCE
NEW JERSEY SITE REMEDIATION CONFERENCE
HYATT REGENCY NEW BRUNSWICK
APRIL 3 & 4, 2024


Society of Women
Environmental Professionals
New Jersey Chapter
LSRPA
BCONE
BROWNFIELD COALITION OF THE NORTHEAST
SAVE THE DATE
BATTLE OF THE BANDS
SCHOLARSHIP FUNDRAISER
MAY 9, 2024
MARTELL'S TIKI BAR
308 BOARDWALK
POINT PLEASANT
Is your band ready to rock? Contact battleofthebands@njswep.org

New Jersey Licensed Site Remediation Professionals Association

@NJLSRPA

Stay connected through lsrpa.org and these social media platforms.

DON'T FORGET TO RENEW YOUR MEMBERSHIP FOR 2024

SCAN ME

Not a Member of the LSRPA?

Advance your knowledge, expertise and career. Get the most current regulatory and technical updates. Network and join committees!

JOIN TODAY!

https://bit.ly/joinlsrpa

NJ LICENSED SITE REMEDIATION PROFESSIONALS ASSOCIATION
LSRPA

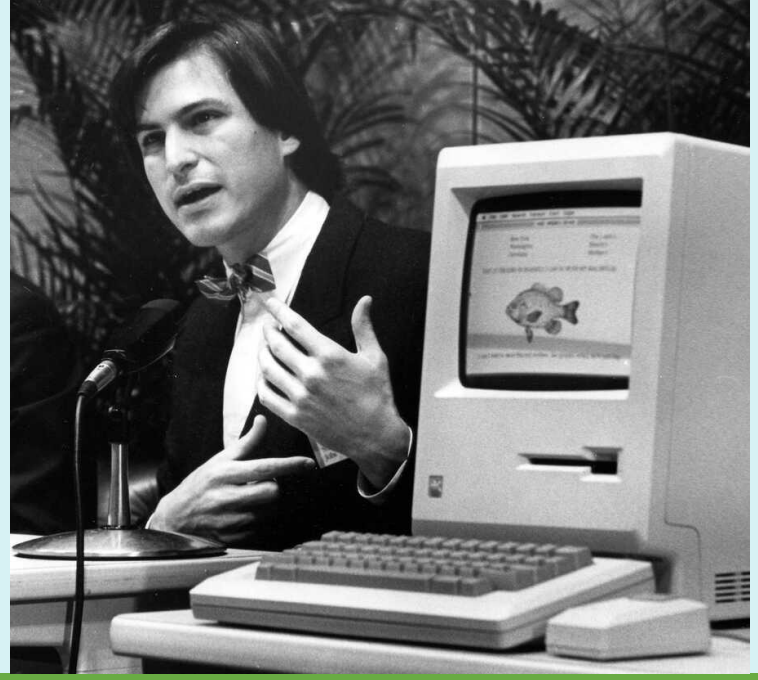
THANK YOU!


NJ LICENSED SITE REMEDIATION
LSRPA
PROFESSIONALS ASSOCIATION

Introduction and History of Perimeter Air Monitoring

January 23, 2024

Allan Motter, Chief
Bureau of Environmental Evaluation and Risk Assessment
Contaminated Site Remediation & Redevelopment



This Day in History

- 1984 The Apple Macintosh computer goes on sale
- The “Mac” was the first commercially successful personal computer using a graphical user interface and a mouse

Introduction – Why do we need Perimeter Air Monitoring (PAM)?

- **Required by N.J.A.C. 7:26E-5.5(b)7 (May 7, 2012)**
  - **A perimeter air monitoring and action plan to be implemented during a remedial action, if applicable, designed to monitor and control off-site excursion of dust, vapor and odors**
    - Applicable
    - Dust, Vapor and Odors
    - Off-Site Excursion
    - Monitor and Control
  - PAM Plan in Remedial Action Workplan (RAW), Document Final PAM Report in Remedial Action Report (RAR)

History

- Initial committee started in 2001
  - Internal committee – completed 2010
  - Document reviewed by NJ Science Advisory Board (SAB) – review completed 2013
  - Released as draft with SAB charge questions

- 2017 Effort
  - NJDEP staff and stakeholders
  - Longest standing committee to produce a document

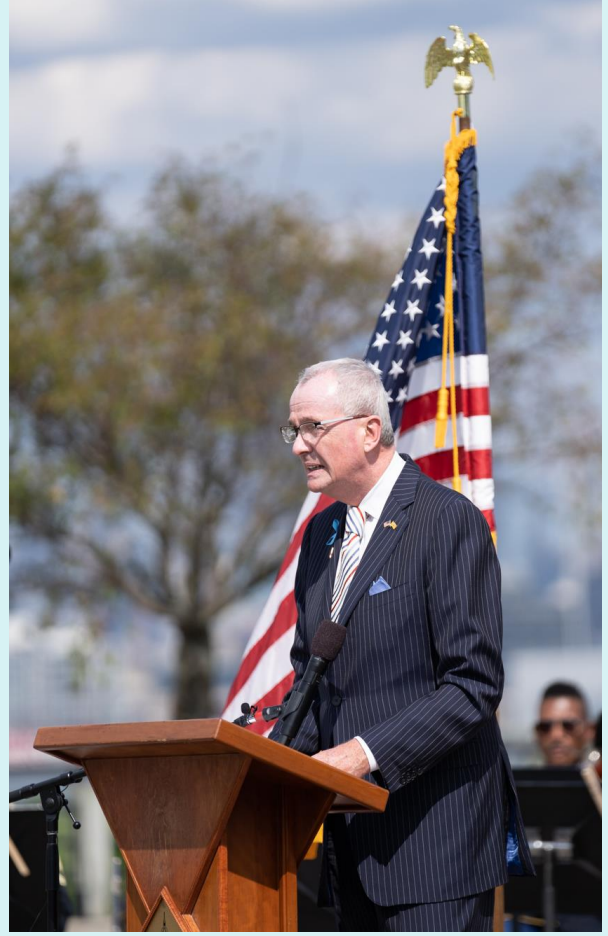
Two Key Terms

- Health-Based Threshold Values (HBTV)
  - Health-based value
  - Time-weighted average for the length of the workday
  - Not to exceed value (averaged over workday)

- Response Level
  - Value at which instrument will be set to alarm
  - Higher than HBTV for non-specific instruments (e.g., photoionization detector (PID), flame ionization detector (FID), dust monitor)

2017 Committee Members

- Retired
  - Terry Sugihara, NJDEP, Chair
  - Kathleen Kunze, NJDEP, Facilitator
- Current
  - Allan Motter, NJDEP, Co-Chair
  - Erica Snyder, NJDEP, Co-Chair
  - Amanda Gettelfinger, NJDEP
  - Deborah Barsotti, Emilcott/Triumvirate Environmental
  - Bruce Groves, Emilcott/Triumvirate Environmental
  - Joann Held, Air Toxics Analysis Services
  - Robert Scotto, Minnich and Scotto, Inc.



Thank you!

Overview, Intended Use, and Applicability of the PAM Guidance Document

January 23, 2024

Joann Held, Air Toxics Analysis Services
Site Remediation Professionals Licensing Board

Topics

- Intended use of this guidance document
- Purpose
- Applicability
- Document overview

Basic Principles

- Real-time monitoring is prioritized
- Deviation from guidance must be documented
- Designated Perimeter Monitoring Technician encouraged
- Best practices employed to minimize air emissions
- Attention must be paid to QA/QC
- Odors must be addressed

Why this document is needed

- Perimeter Air Monitoring is required by the Tech Regs (N.J.A.C. 7:26E-5.5(b)7)

- Previously, only draft guidance has existed

- Reminder: Departure from Guidance must be documented (N.J.A.C. 7:26E-1.5(b))

When does this become applicable?

- **There is a 6-month "phase in" period for guidance**
  - It must be used by June 3, 2024

- **However, you may begin using this guidance immediately**
  - This option is encouraged, unless you are already in the middle of a PAM program

Purpose of this Guidance Document

- When is PAM required
- How to plan and execute a PAM program
- Evaluating data and taking “actions”
- Quality of the PAM program
- Emphasis on real time monitoring

Who does the planning and the work?

- Investigator (may be an LSRP, non-LSRP environmental consultant or other environmental professional)
- Designated Perimeter Monitoring Technician
- Reminder to LSRPs:
  - An LSRP shall not provide professional services outside his or her areas of professional competence, unless the LSRP has relied upon the technical assistance of another professional whom the LSRP has reasonably determined to be qualified by education, training, and experience (N.J.A.C. 7:26I-6.3(e))

What triggers the PAM requirements?

- Remediation activities
  - With potential to generate air emissions
  - Project duration greater than 20 working days within a 30-day period
  - Off-site receptors may be impacted

- May be exception if in direct oversight

Test Your Knowledge

Poll #1

Is Perimeter Air Monitoring required by regulation?

A. No
B. Yes

Poll #1

Is Perimeter Air Monitoring required by regulation?

A. No

B. Yes

As per the Technical Requirements for Site Remediation (N.J.A.C. 7:26E-5.5(b)7)

Document Overview

- Perimeter Air Monitoring plan development (7 steps)
- Quality assurance considerations
- Additional considerations
- Appendices
- PAM calculator

Document Overview: Seven Steps

1. Contaminants of Concern (COCs)
2. Potential Airborne Exposures
3. Health-Based Threshold Values (HBTVs) & response levels
4. Monitoring Methods & Technologies
5. Sampling & Monitoring Locations & Schedules
6. Actions to Address Exceedances of response levels & HBTVs
7. Plan Review, Modifications & Documentation

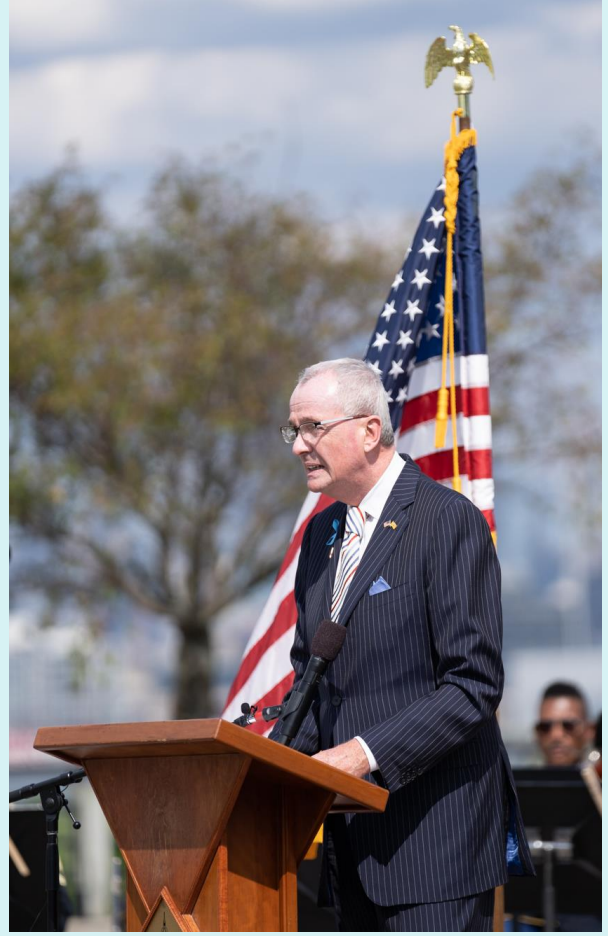
Document Overview: Additional Considerations

- Analytical Sampling Concerns
- Real-Time Monitoring Concerns
- Asbestos
- Air Permits
- Hot Spots
- Best Management Practices

Document Overview: Appendices

A. PAM Plan Contents
B. HBTV Equations & Inhalation Toxicity Factors
C. Real-Time Monitoring Methods
D. Analytical Methods
E. Data Quality Objective Checklists
F. Case Study
G. Glossary
H. Acronyms

Final Notes



Thank you!

PAM Steps 1-3: Shining Light on the "Black Box"

January 23, 2024

Deborah Barsotti, Ph.D., DABT, Toxicologist
Emilcott/Triumvirate Environmental

Toxicology 101

Paracelsus (Father of Toxicology, 1493-1541)

"All things are poisons - the dose makes the difference…"

Toxicity x Exposure (Dose) = Risk or Hazard

Why is this concept important for Perimeter Air Monitoring (PAM)?

Protective of Human Health

Concentration of inhaled exposure over the specified time (dose) that **would not** cause adverse health effects

Step 1: Identify Contaminants of Concern (COCs)

- Collect sufficient data to characterize the site
- Focus to control and monitor off-site inhalation exposures
- Target:
  - Volatile Organic Chemicals (VOCs)
  - Semi-volatile Organic Chemicals (SVOCs)
  - Inhalable Particulate Matter (PM_{10})
  - Other compounds (e.g., mercury vapor, metal fumes, and odorants)

Step 1: Identify Contaminants of Concern (COCs) (Cont.)

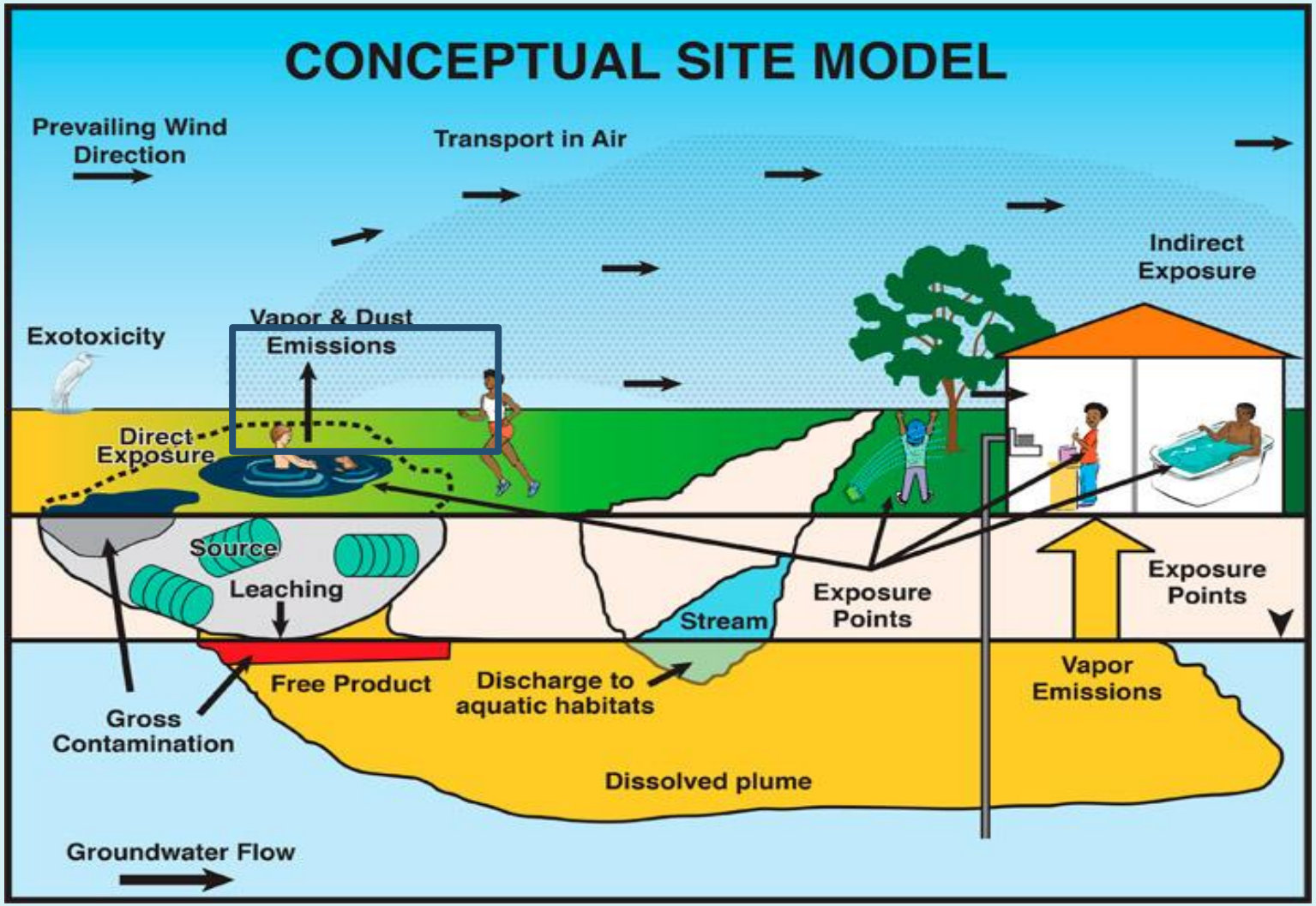
- **Predict inhalation exposures from duration of remedial action using PAM calculator**

- Consider:
  - Acute short-term exposure
  - Long-term exposure
  - Exceedances of PM_{10} National Ambient Air Quality Standard (NAAQS) of 150 ug/m^3
  - Nuisance odors (H_2S, NH_3)

Step 2: Identify Potential Airborne Exposure Conceptual Site Model (CSM)

- Components
  - Based on how COCs from Step 1 impact receptors
  - Characteristics of source material
  - Transport mechanisms (air and/or particulates)
  - Inhalation exposure pathways
- Update with new data and information
- Effective communication tool for stakeholders and community

Step 2: Identify Potential Airborne Exposure CSM (Cont.)

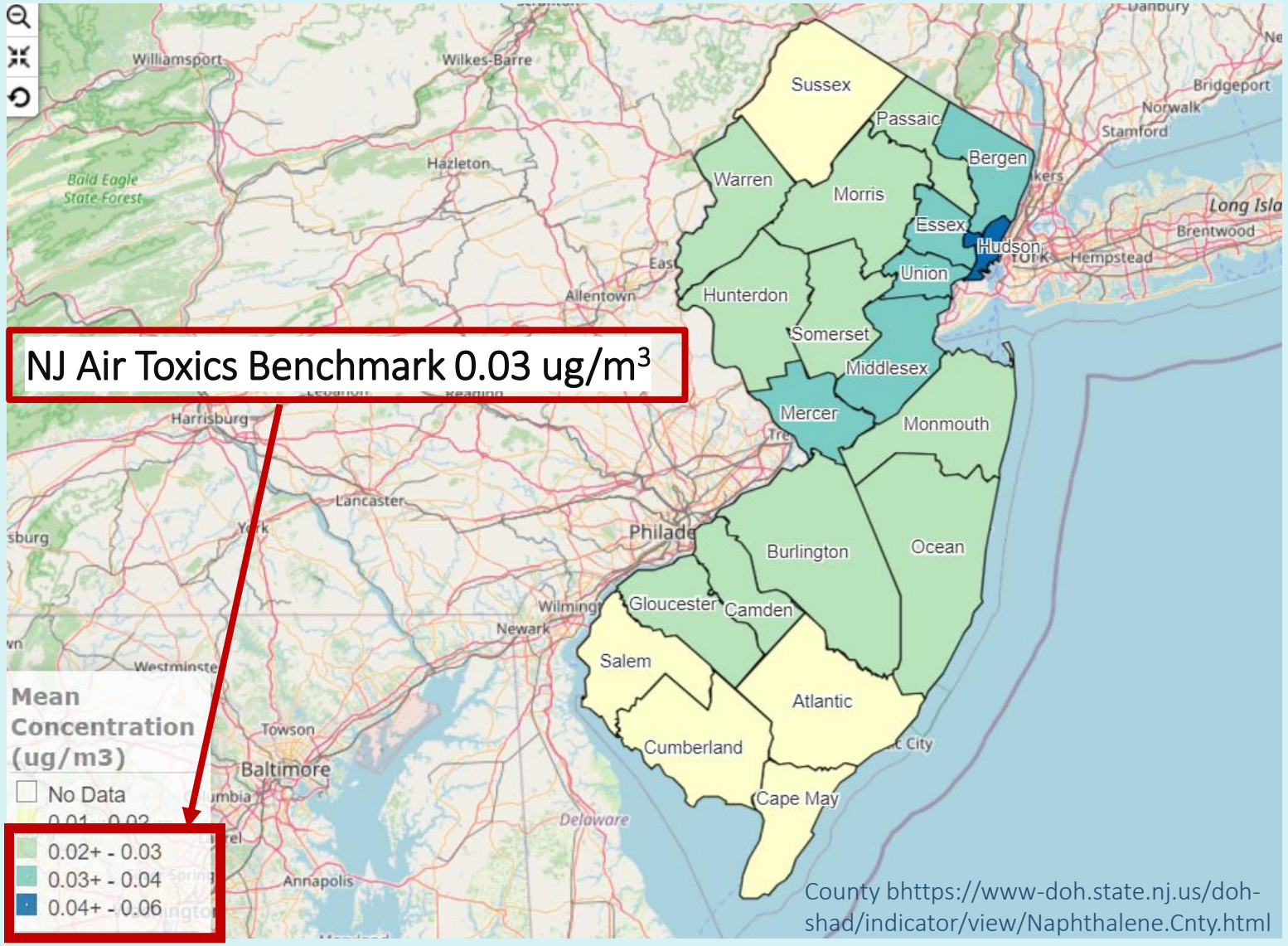


Step 2: Identify Potential Airborne Exposure CSM (Cont.)

CSM answers important questions:

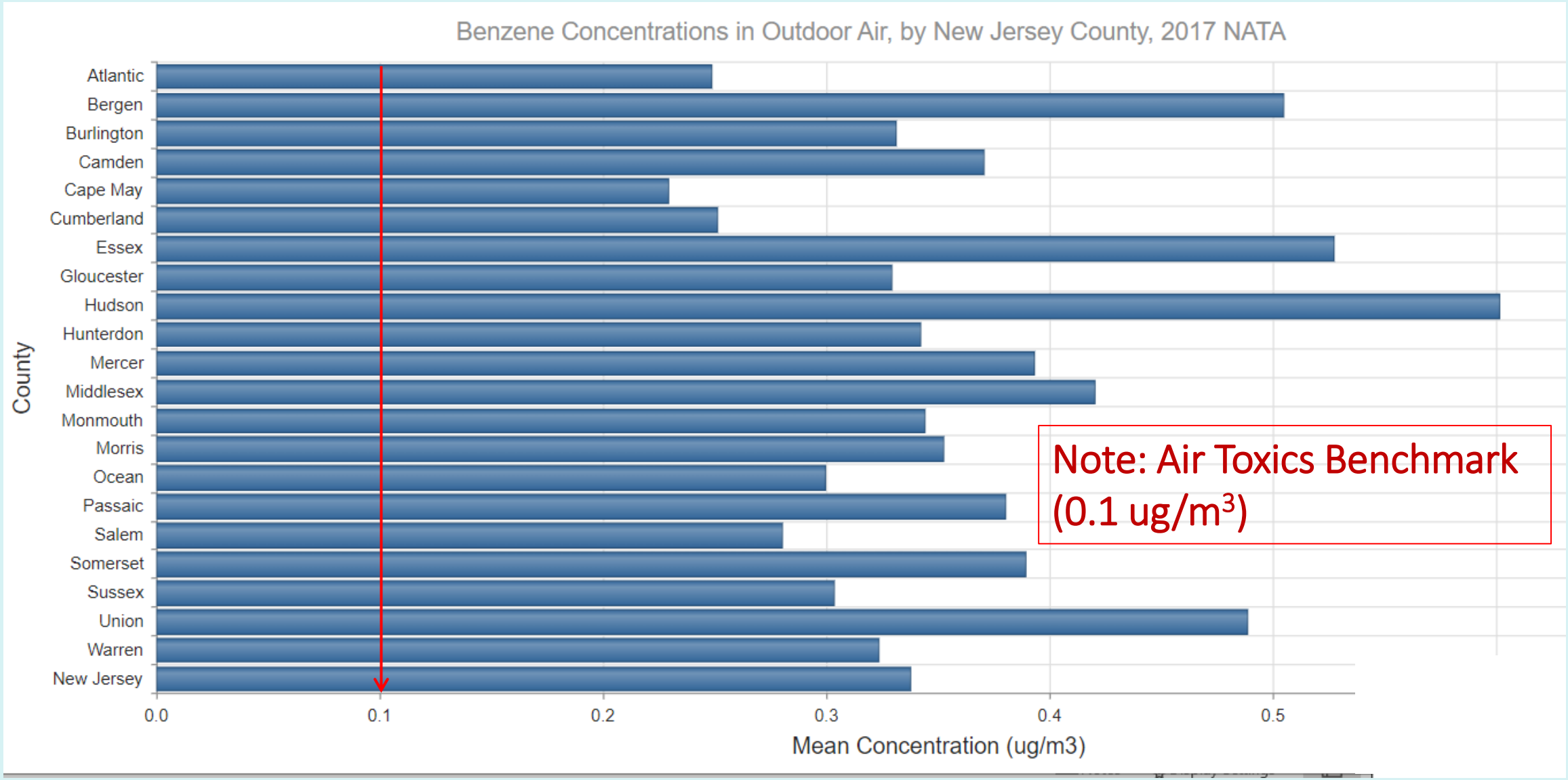
- What are the source materials and emission generating activities?
- How are COCs transported to off-site receptors?
- What are the exposure pathways (particulate or volatiles)?
- Is there another source of the COCs (i.e., upwind off-site)?
- Who are the potential receptors of concern?

Naphthalene Concentrations: 2017



County bhttps://www-doh.state.nj.us/doh-shad/indicator/view/Naphthalene.Cnty.html

Concentrations of Benzene in Ambient Air



Step 3: Establish Health-Based Threshold Values (HBTVs)

What are HBTVs?

- Based on NJDEP hierarchy of toxicity factors
  - Same toxicity factors used for remediation standards
  - 1 x10^{-6} risk for carcinogens
  - Hazard Quotient (HQ) of 1 for noncarcinogens
- PAM calculator can be used
- Contaminant-specific lab and real-time monitoring data compared to HBTV

What is the difference between an HBTV and a Response Level?

HBTV

- Chemical-specific
- Exposure (dose)
  - 8-10 hours/day
  - Equal to or less than 1 year
- Toxicity
  - Cancer (10^{-6} risk)
  - Noncancer Hazard Quotient =1

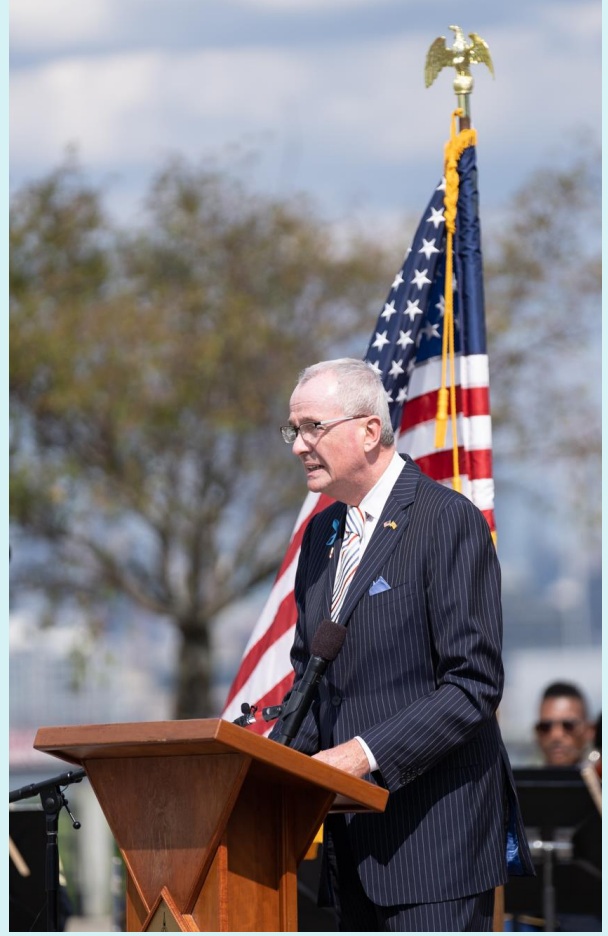
Response Level

- Usually not chemical-specific but a surrogate for the HBTV
- Particulates – adjust specific COC to a dust level to measure real time
  - HBTV*(10^6/Soil Concentration)
- Volatiles – adjust specific VOC to a total VOCs to measure real time total VOC meter
  - HBTV*(100/% Total Volatiles)

Step 3: Establish Response Levels

What are response levels?

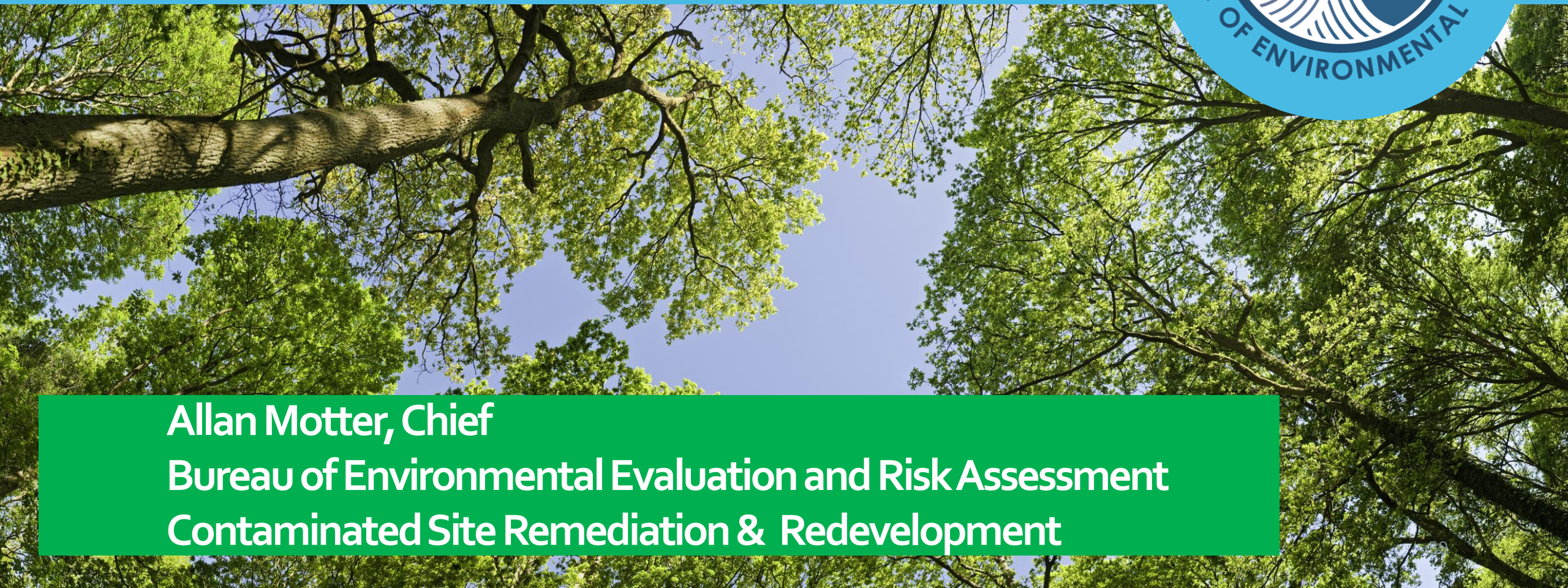
- Based on HBTVs
  - Adjusted based on soil concentrations
  - Consideration of methods for real-time monitoring
- Surrogate for HBTVs, e.g., PM_{10} for particulate bound COCs
- Less restrictive than HBTV
- Require chemical-specific laboratory sampling to confirm assumptions



Thank you!

PAM Calculator

January 23, 2024



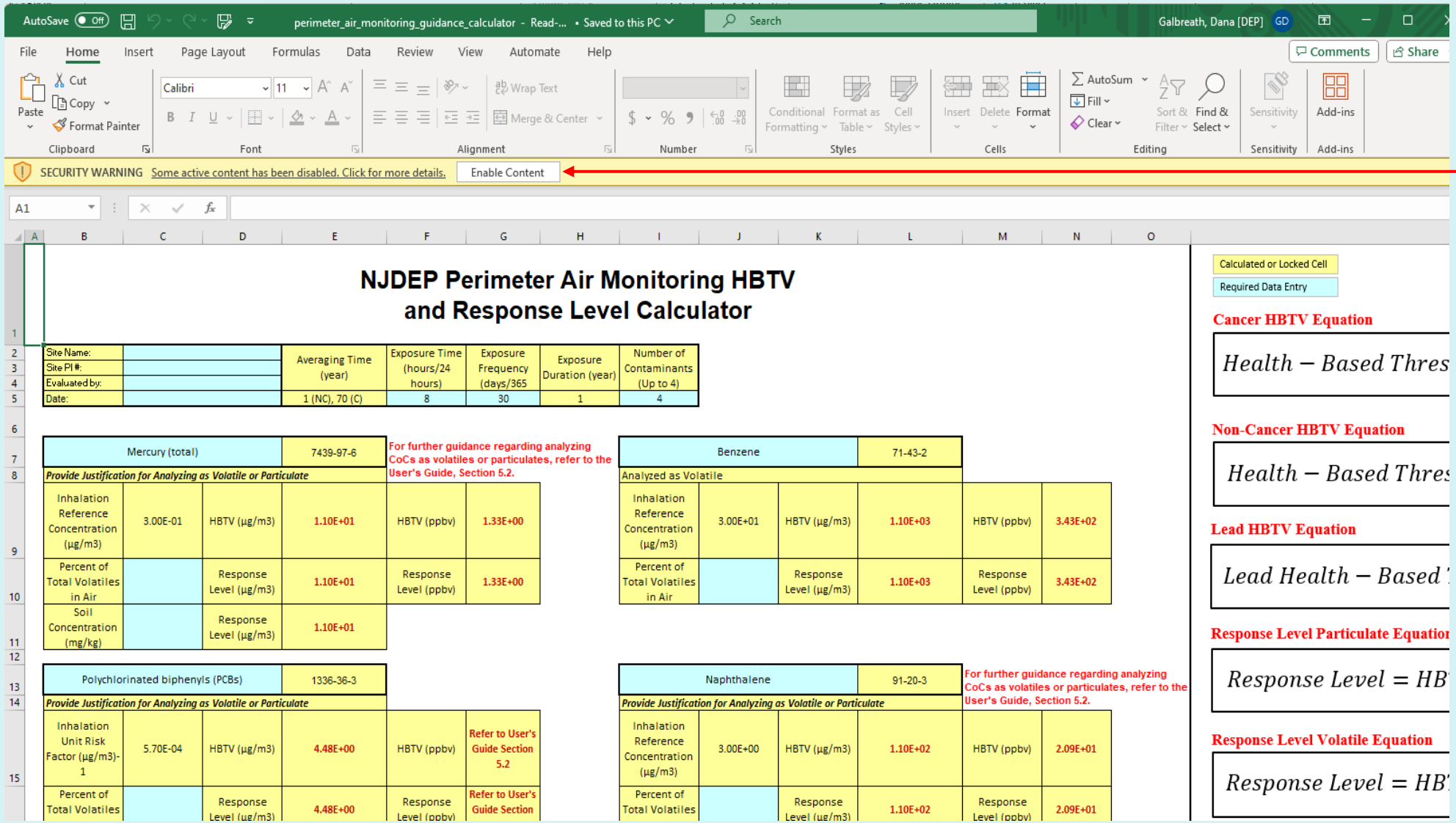
Allan Motter, Chief
Bureau of Environmental Evaluation and Risk Assessment
Contaminated Site Remediation & Redevelopment

PAM Calculator: What is the Purpose?

Why should investigators use the calculator?

- Sites can contain different contaminants that may require perimeter air monitoring, but the Health-Based Threshold Values (HBTVs) vary based on exposure parameters, and response levels vary based upon the level of contamination on the site
- The calculations to determine these thresholds may be complicated, and calculating site-specific HBTVs and response levels for each contaminant could be a significant time cost
- This tool was created so that investigators may use the calculator to quickly create site-specific HBTVs and response levels

Upon Opening the Calculator



Be sure to enable content so that the calculator's macros will run

Upon Opening the Calculator (Cont.)

NJDEP Perimeter Air Monitoring HBTV and Response Level Calculator

		Averaging Time (year)	Exposure Time (hours/24 hours)	Exposure Frequency (days/365	Exposure Duration (year)	Number of Contaminants (Up to 4)
Site Name:						
Site PI #:						
Evaluated by:						
Date:		1(NC), 70 (C)	8	30	1	4

Mercury (total)			7439-97-6		
Provide Justification for Analyzing as Volatile or					
Inhalation Reference Concentration (µg/m3)	3.00E-01	HBTV (µg/m3)	1.10E+01	HBTV (ppbv)	1.33E+00
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+01	Response Level (ppbv)	1.33E+00
Soil Concentration (mg/kg)		Response Level (µg/m3)	1.10E+01		

For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.

Benzene			71-43-2		
Analyzed as Volatile					
Inhalation Reference Concentration (µg/m3)	3.00E+01	HBTV (µg/m3)	1.10E+03	HBTV (ppbv)	3.43E+02
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+03	Response Level (ppbv)	3.43E+02

Polychlorinated biphenyls (PCBs)			1336-36-3		
Provide Justification for Analyzing as Volatile or					
Inhalation Unit Risk Factor (µg/m3)-1	5.70E-04	HBTV (µg/m3)	4.48E+00	HBTV (ppbv)	Refer to User's Guide Section 5.2
Percent of Total Volatiles in Air		Response Level (µg/m3)	4.48E+00	Response Level (ppbv)	Refer to User's Guide
Soil Concentration (mg/kg)		Response Level (µg/m3)	4.48E+00		

Naphthalene			91-20-3		
Provide Justification for Analyzing as Volatile or					
Inhalation Reference Concentration (µg/m3)	3.00E+00	HBTV (µg/m3)	1.10E+02	HBTV (ppbv)	2.09E+01
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+02	Response Level (ppbv)	2.09E+01
Soil Concentration (mg/kg)		Response Level (µg/m3)	1.10E+02		

For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.

Reset Values | Reset Chemicals | Reset All | Print | Go to User's Guide | Exit

Calculated or Locked Cell

Required Data Entry

Cancer HBTV Equation

$$Health - Based\ Threshold\ Value = \frac{TR * AT}{IUR * ET * EF * ED}$$

Non-Cancer HBTV Equation

$$Health - Based\ Threshold\ Value = \frac{RfC * AT}{ET * EF * ED}$$

Lead HBTV Equation

$$Lead\ Health - Based\ Threshold\ Value = \frac{RfC * AT}{ET}$$

Response Level Particulate Equation

$$Response\ Level = HBTV * \frac{10^6}{Soil\ Concentration}$$

Response Level Volatile Equation

$$Response\ Level = HBTV * \frac{100}{Percent\ of\ Total\ Volatiles\ in\ Air}$$

Cancer Target Risk

$$TR = 10^{-6}$$

Term Definitions

HBTV = Health-Based Threshold Value
AT = Averaging Time = 1 year
ET = Exposure Time = Work shift length (hours/24 hours)
ED = Exposure Duration = 1 year
TR = Target Risk = 1 x 10^6
IUR = Inhalation Unit Risk = Contaminant-specific but in terms of (µg/m³)$^{-1}$
EF = Exposure Frequency = Length of actual excavation (days/365 days)
RfC = Reference Concentration = Contaminant-specific (µg/m³)

Calculator | User's Guide

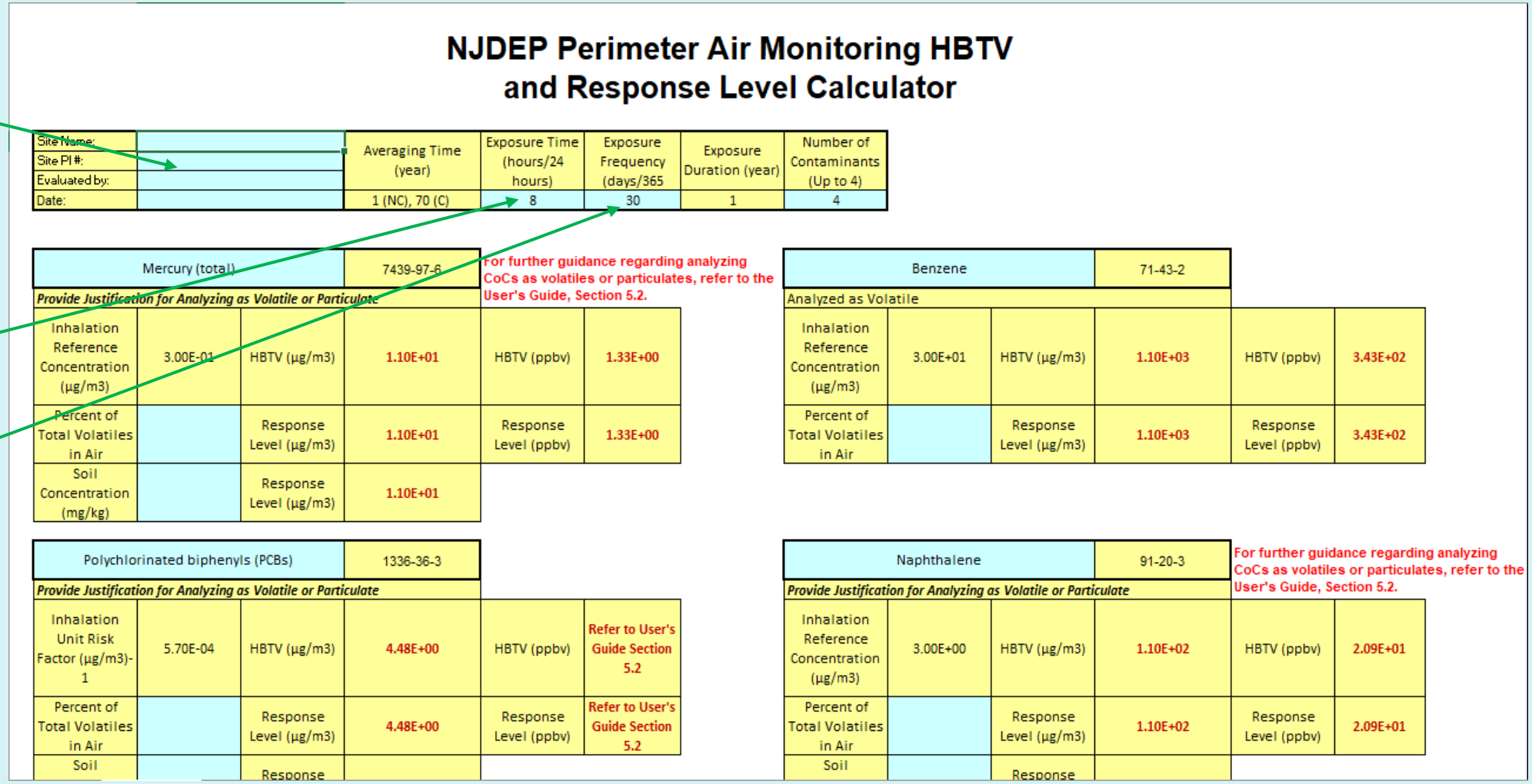
Select destination and press ENTER or choose Paste

How to Use the Calculator

Fill in blue boxes with your site information. Yellow boxes cannot be edited

Exposure time (8 to 12 hours) and frequency (20 to 225 days) can be edited as well

If values outside of those ranges are entered, an error message will appear



NJDEP Perimeter Air Monitoring HBTV and Response Level Calculator

		Averaging Time (year)	Exposure Time (hours/24 hours)	Exposure Frequency (days/365	Exposure Duration (year)	Number of Contaminants (Up to 4)
Site Name:						
Site PI #:						
Evaluated by:						
Date:		1 (NC), 70 (C)	8	30	1	4

Mercury (total)			7439-97-6		
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E-01	HBTV (µg/m3)	1.10E+01	HBTV (ppbv)	1.33E+00
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+01	Response Level (ppbv)	1.33E+00
Soil Concentration (mg/kg)		Response Level (µg/m3)	1.10E+01		

For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.

Benzene			71-43-2		
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Inhalation Reference Concentration (µg/m3)	3.00E+01	HBTV (µg/m3)	1.10E+03	HBTV (ppbv)	3.43E+02
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+03	Response Level (ppbv)	3.43E+02

Polychlorinated biphenyls (PCBs)			1336-36-3		
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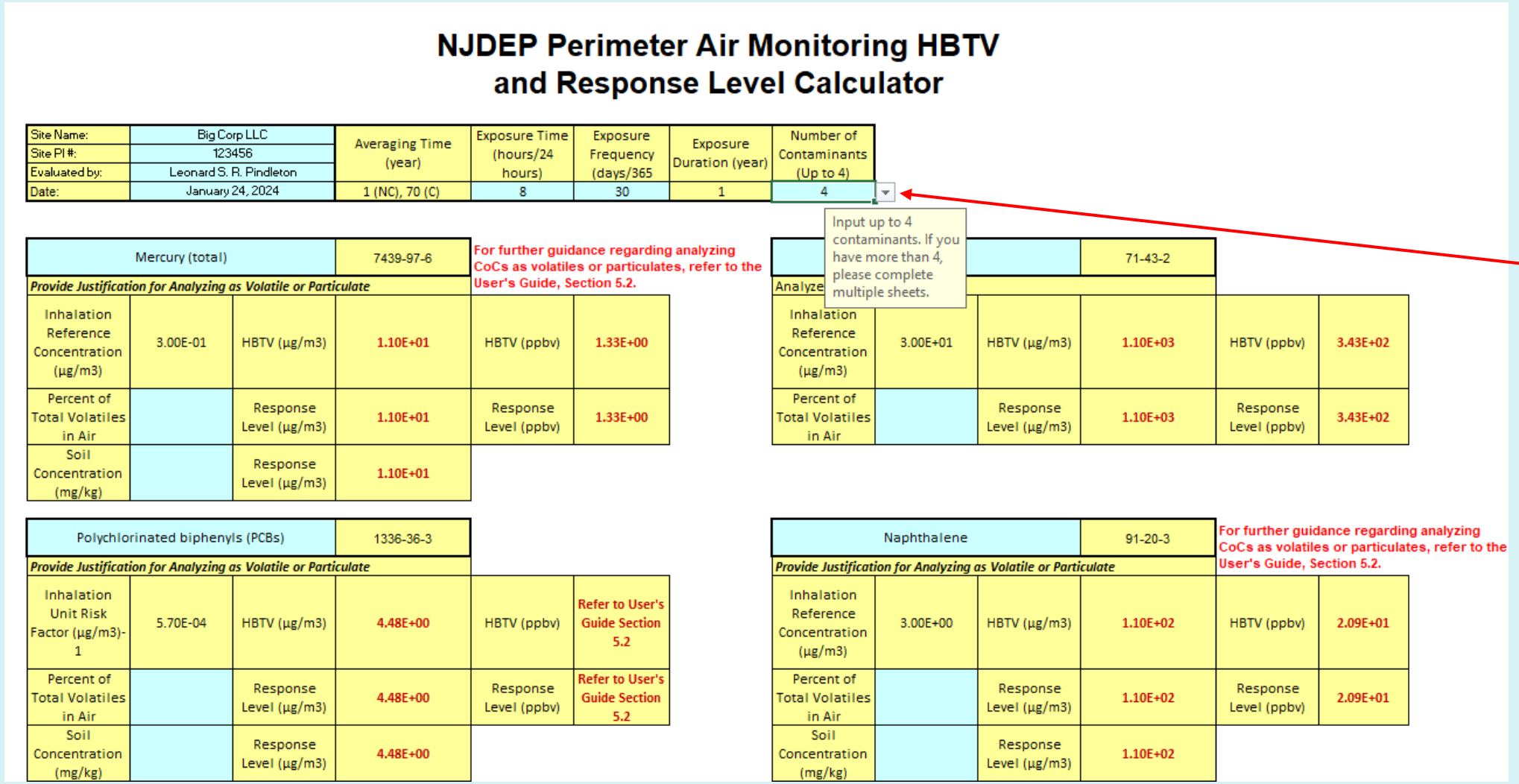
Inhalation Unit Risk Factor (µg/m3)-1	5.70E-04	HBTV (µg/m3)	4.48E+00	HBTV (ppbv)	Refer to User's Guide Section 5.2
Percent of Total Volatiles in Air		Response Level (µg/m3)	4.48E+00	Response Level (ppbv)	Refer to User's Guide Section 5.2
Soil		Response			

Naphthalene			91-20-3		
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E+00	HBTV (µg/m3)	1.10E+02	HBTV (ppbv)	2.09E+01
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+02	Response Level (ppbv)	2.09E+01
Soil		Response			

For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.

How to Use the Calculator (Cont.)



NJDEP Perimeter Air Monitoring HBTV and Response Level Calculator

		Averaging Time (year)	Exposure Time (hours/24 hours)	Exposure Frequency (days/365	Exposure Duration (year)	Number of Contaminants (Up to 4)
Site Name:	Big Corp LLC					
Site PI #:	123456					
Evaluated by:	Leonard S. R. Pindleton					
Date:	January 24, 2024	1 (NC), 70 (C)	8	30	1	4

Input up to 4 contaminants. If you have more than 4, please complete multiple sheets.

Mercury (total)			7439-97-6		
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E-01	HBTV (µg/m3)	1.10E+01	HBTV (ppbv)	1.33E+00
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+01	Response Level (ppbv)	1.33E+00
Soil Concentration (mg/kg)		Response Level (µg/m3)	1.10E+01		

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			71-43-2		
Analyze					
Inhalation Reference Concentration (µg/m3)	3.00E+01	HBTV (µg/m3)	1.10E+03	HBTV (ppbv)	3.43E+02
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+03	Response Level (ppbv)	3.43E+02

Polychlorinated biphenyls (PCBs)			1336-36-3		
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Unit Risk Factor (µg/m3)-1	5.70E-04	HBTV (µg/m3)	4.48E+00	HBTV (ppbv)	Refer to User's Guide Section 5.2
Percent of Total Volatiles in Air		Response Level (µg/m3)	4.48E+00	Response Level (ppbv)	Refer to User's Guide Section 5.2
Soil Concentration (mg/kg)		Response Level (µg/m3)	4.48E+00		

Naphthalene			91-20-3		
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E+00	HBTV (µg/m3)	1.10E+02	HBTV (ppbv)	2.09E+01
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+02	Response Level (ppbv)	2.09E+01
Soil Concentration (mg/kg)		Response Level (µg/m3)	1.10E+02		

For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.

Select your number of contaminants. If you have more than 4, you will need to print the current sheet, save it, and start a new sheet with your new contaminants

How to Use the Calculator (Cont.)

Mercury (total)	7439-97-6				
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E-01	HBTV (µg/m3)	1.10E+01	HBTV (ppbv)	1.33E+00
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+01	Response Level (ppbv)	1.33E+00
Soil Concentration (mg/kg)		Response Level (µg/m3)	1.10E+01		

For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.

Benzene	71-43-2				
Analyzed as Volatile					
Inhalation Reference Concentration (µg/m3)	3.00E+01	HBTV (µg/m3)	1.10E+03	HBTV (ppbv)	3.43E+02
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+03	Response Level (ppbv)	3.43E+02

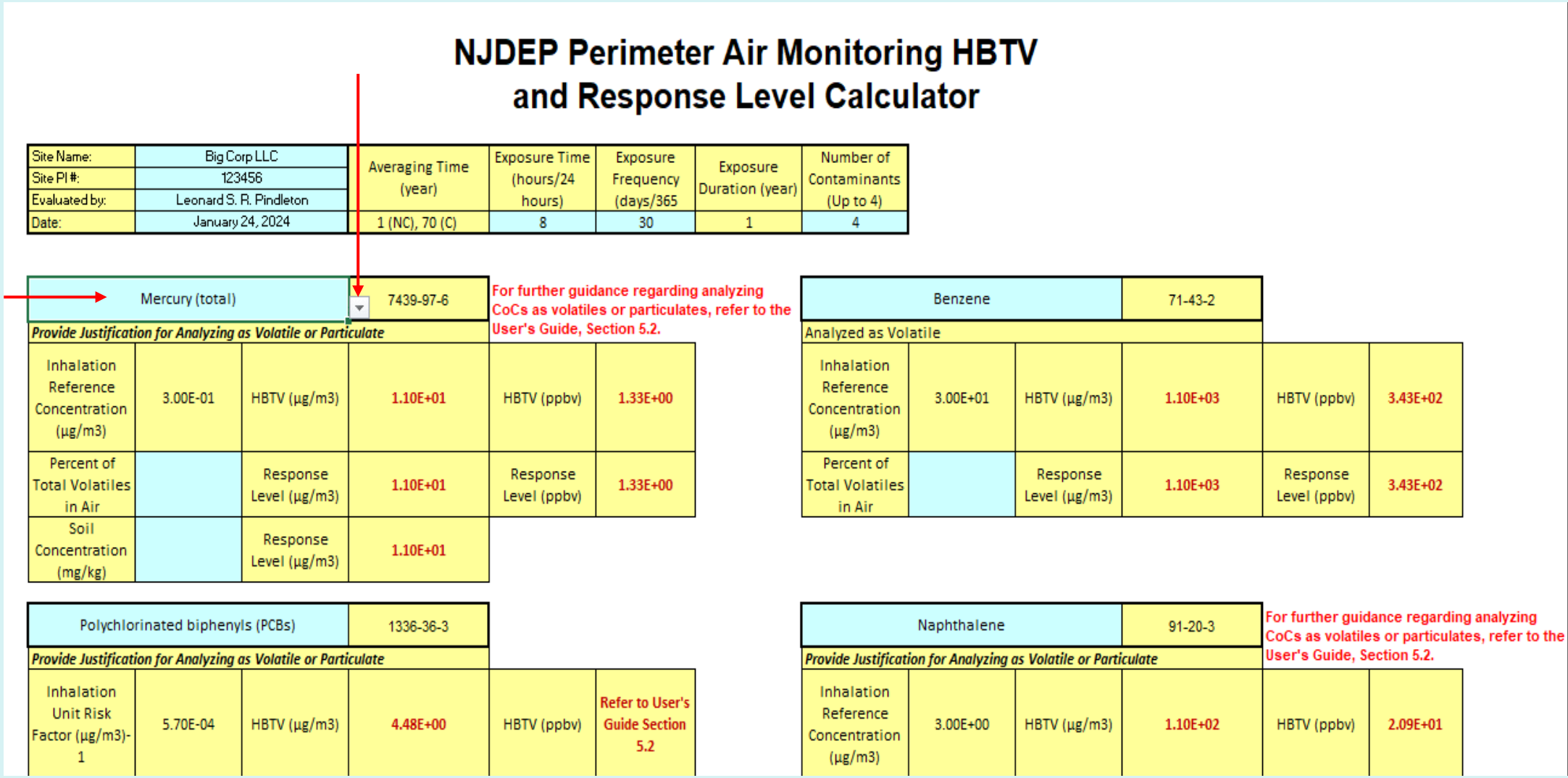
Polychlorinated biphenyls (PCBs)	1336-36-3				
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Unit Risk Factor (µg/m3)-1	5.70E-04	HBTV (µg/m3)	4.48E+00	HBTV (ppbv)	Refer to User's Guide Section 5.2
Percent of Total Volatiles in Air		Response Level (µg/m3)	4.48E+00	Response Level (ppbv)	Refer to User's Guide Section 5.2
Soil Concentration (mg/kg)		Response Level (µg/m3)	4.48E+00		

Naphthalene	91-20-3				
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E+00	HBTV (µg/m3)	1.10E+02	HBTV (ppbv)	2.09E+01
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+02	Response Level (ppbv)	2.09E+01
Soil Concentration (mg/kg)		Response Level (µg/m3)	1.10E+02		

For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.

Reset Values | Reset Chemicals | Reset All | Print | ? | Go to User's Guide | Exit

How to Use the Calculator (Cont.)



NJDEP Perimeter Air Monitoring HBTV and Response Level Calculator

		Averaging Time (year)	Exposure Time (hours/24 hours)	Exposure Frequency (days/365	Exposure Duration (year)	Number of Contaminants (Up to 4)
Site Name:	Big Corp LLC					
Site PI #:	123456					
Evaluated by:	Leonard S. R. Pindleton					
Date:	January 24, 2024	1 (NC), 70 (C)	8	30	1	4

Mercury (total)	7439-97-6	For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.

Provide Justification for Analyzing as Volatile or Particulate

Inhalation Reference Concentration (µg/m3)	3.00E-01	HBTV (µg/m3)	1.10E+01	HBTV (ppbv)	1.33E+00
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+01	Response Level (ppbv)	1.33E+00
Soil Concentration (mg/kg)		Response Level (µg/m3)	1.10E+01		

Benzene	71-43-2

Analyzed as Volatile

Inhalation Reference Concentration (µg/m3)	3.00E+01	HBTV (µg/m3)	1.10E+03	HBTV (ppbv)	3.43E+02
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+03	Response Level (ppbv)	3.43E+02

Polychlorinated biphenyls (PCBs)	1336-36-3

Provide Justification for Analyzing as Volatile or Particulate

Inhalation Unit Risk Factor (µg/m3)-1	5.70E-04	HBTV (µg/m3)	4.48E+00	HBTV (ppbv)	Refer to User's Guide Section 5.2

Naphthalene	91-20-3	For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.

Provide Justification for Analyzing as Volatile or Particulate

Inhalation Reference Concentration (µg/m3)	3.00E+00	HBTV (µg/m3)	1.10E+02	HBTV (ppbv)	2.09E+01

How to Use the Calculator (Cont.)

NJDEP Perimeter Air Monitoring HBTV and Response Level Calculator

Site Name:	Big Corp LLC	Averaging Time (year)	Exposure Time (hours/24 hours)	Exposure Frequency (days/365	Exposure Duration (year)	Number of Contaminants (Up to 4)
Site PI #:	123456					
Evaluated by:	Leonard S. R. Pindleton					
Date:	January 24, 2024	1 (NC), 70 (C)	8	30	1	2

Lead (total)			7439-92-1
Analyzed as Particulate			
Lead NAAQS 0.15 µg/m3	1.50E-01	HBTV (µg/m3)	4.50E-01
Soil Concentration (mg/kg)	6.00E+03	Response Level (µg/m3)	7.50E+01

Benzene			71-43-2		
Analyzed as Volatile					
Inhalation Reference Concentration (µg/m3)	3.00E+01	HBTV (µg/m3)	1.10E+03	HBTV (ppbv)	3.43E+02
Percent of Total Volatiles in Air	5.00E+01	Response Level (µg/m3)	2.19E+03	Response Level (ppbv)	6.86E+02

How to Use the Calculator (Cont.)

NJDEP Perimeter Air Monitoring HBTV and Response Level Calculator

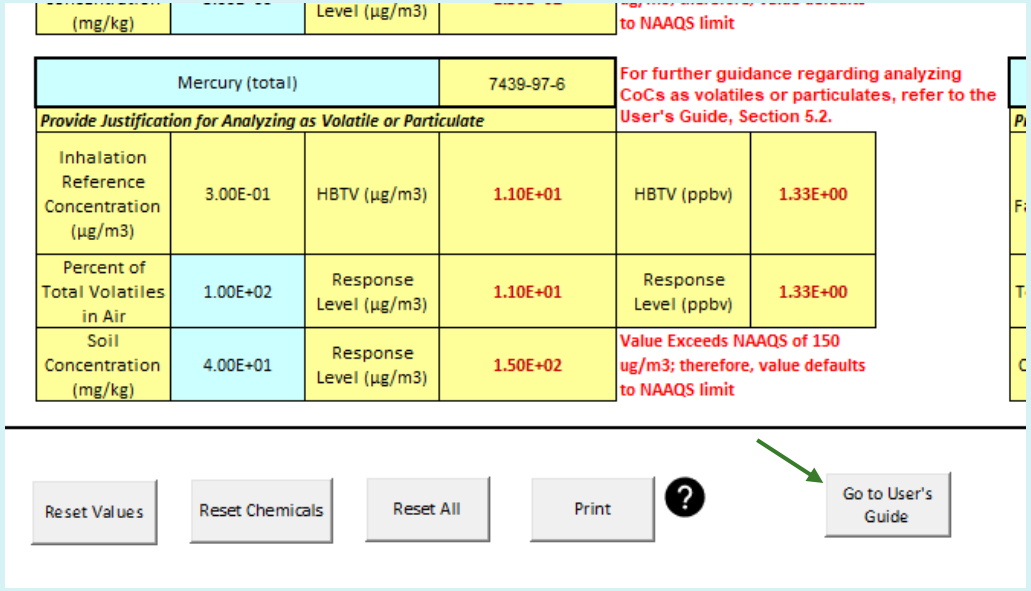
		Averaging Time (year)	Exposure Time (hours/24 hours)	Exposure Frequency (days/365	Exposure Duration (year)	Number of Contaminants (Up to 4)
Site Name:	Big Corp LLC					
Site PI #:	123456					
Evaluated by:	Leonard S. R. Pindleton					
Date:	January 24, 2024	1 (NC), 70 (C)	8	30	1	1

Naphthalene			91-20-3		
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E+00	HBTV (µg/m3)	1.10E+02	HBTV (ppbv)	2.09E+01
Percent of Total Volatiles in Air	4.00E+01	Response Level (µg/m3)	2.74E+02	Response Level (ppbv)	5.22E+01
Soil Concentration (mg/kg)	5.00E+00	Response Level (µg/m3)	1.50E+02		

For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.

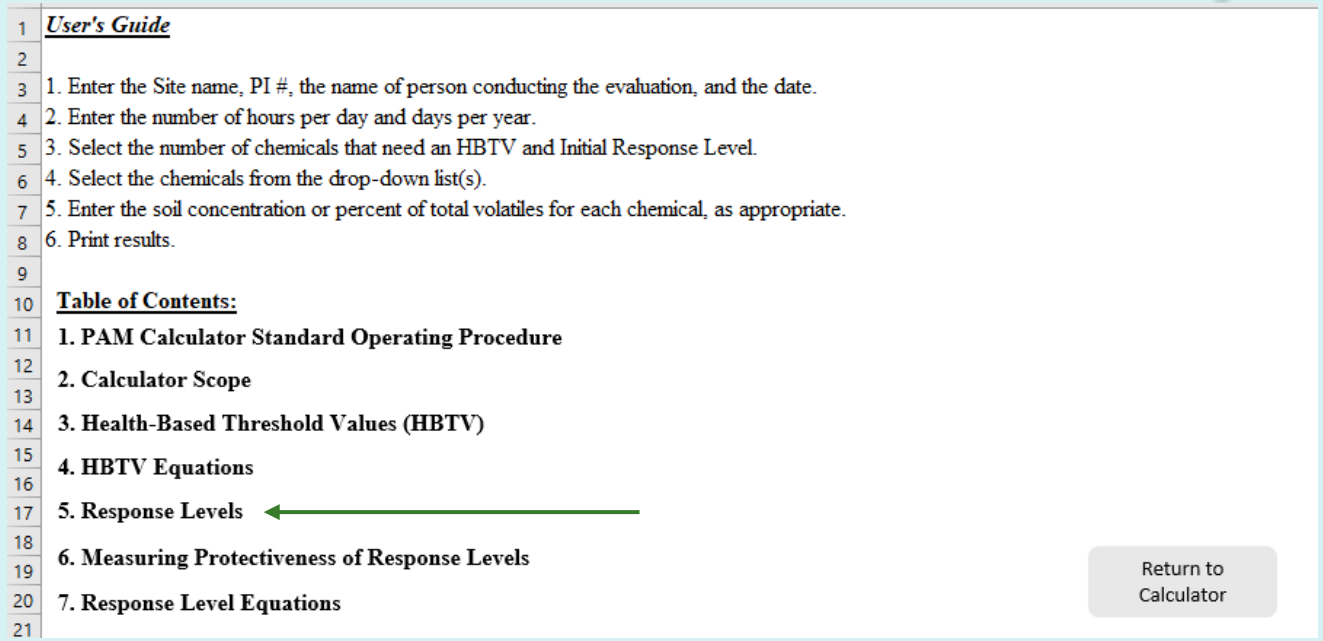
Value Exceeds NAAQS of 150 ug/m3; therefore, value defaults to NAAQS limit

How to Use the Calculator (Cont.)



(mg/kg)		Level (µg/m3)		to NAAQS limit	
Mercury (total)			7439-97-6	For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.	
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E-01	HBTV (µg/m3)	1.10E+01	HBTV (ppbv)	1.33E+00
Percent of Total Volatiles in Air	1.00E+02	Response Level (µg/m3)	1.10E+01	Response Level (ppbv)	1.33E+00
Soil Concentration (mg/kg)	4.00E+01	Response Level (µg/m3)	1.50E+02	Value Exceeds NAAQS of 150 ug/m3; therefore, value defaults to NAAQS limit	

Reset Values | Reset Chemicals | Reset All | Print | ? | Go to User's Guide



User's Guide

1. Enter the Site name, PI #, the name of person conducting the evaluation, and the date.
2. Enter the number of hours per day and days per year.
3. Select the number of chemicals that need an HBTV and Initial Response Level.
4. Select the chemicals from the drop-down list(s).
5. Enter the soil concentration or percent of total volatiles for each chemical, as appropriate.
6. Print results.

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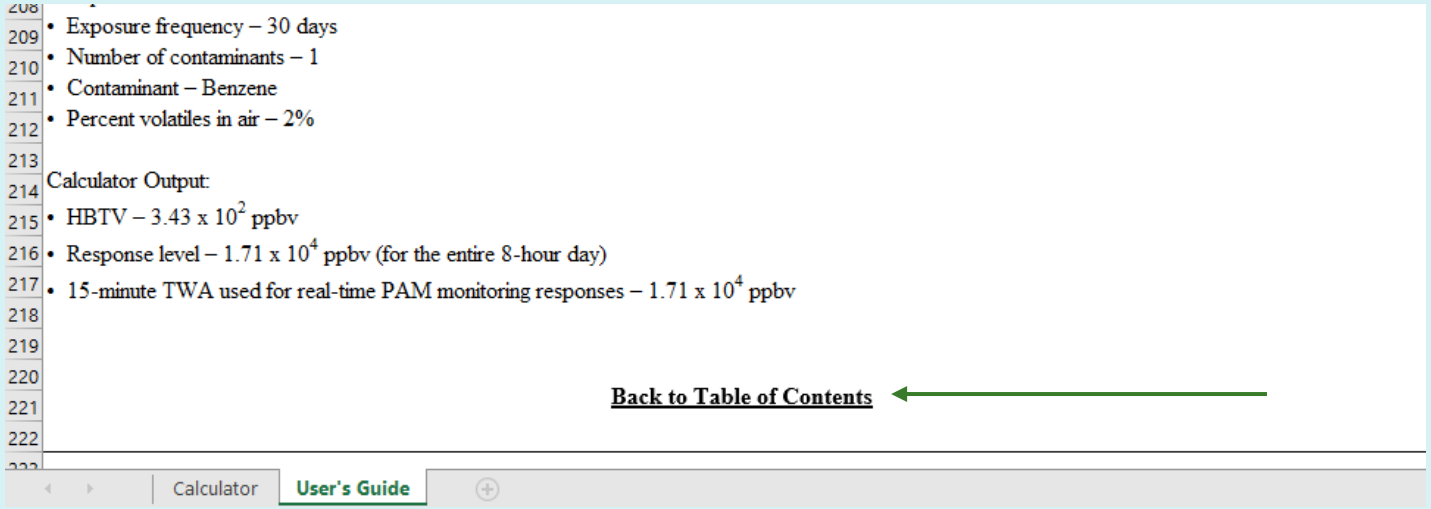
Return to Calculator



- Exposure frequency – 30 days
- Number of contaminants – 1
- Contaminant – Benzene
- Percent volatiles in air – 2%

Calculator Output:

- HBTV – 3.43 x 10^2 ppbv
- Response level – 1.71 x 10^4 ppbv (for the entire 8-hour day)
- 15-minute TWA used for real-time PAM monitoring responses – 1.71 x 10^4 ppbv

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Calculator | User's Guide

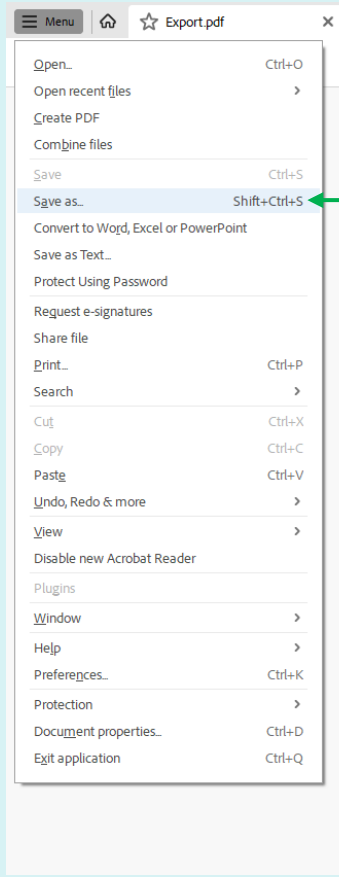
How to Use the Calculator (Cont.)

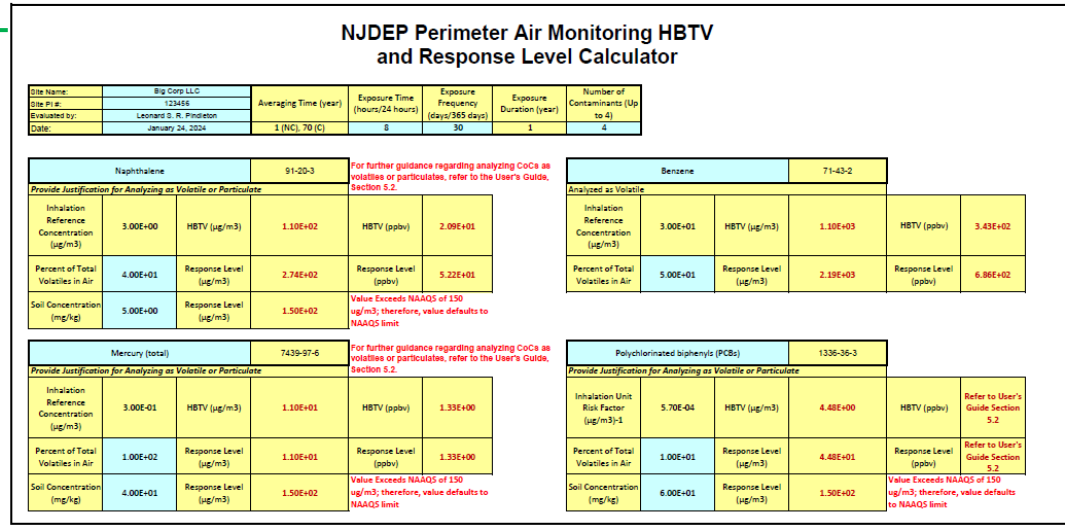
Site Name:	Big Corp LLC	Averaging Time (year)	Exposure Time (hours/24 hours)	Exposure Frequency (days/365	Exposure Duration (year)	Number of Contaminants (Up to 4)
Site PI #:	123456					
Evaluated by:	Leonard S. R. Pindleton					
Date:	January 24, 2024	1 (NC), 70 (C)	8	30	1	4

Naphthalene			91-20-3	For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.	
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E+00	HBTV (µg/m3)	1.10E+02	HBTV (ppbv)	2.09E+01
Percent of Total Volatiles in Air	4.00E+01	Response Level (µg/m3)	2.74E+02	Response Level (ppbv)	5.22E+01
Soil Concentration (mg/kg)	5.00E+00	Response Level (µg/m3)	1.50E+02	Value Exceeds NAAQS of 150 ug/m3; therefore, value defaults to NAAQS limit	

Mercury (total)			7439-97-6	For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.	
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E-01	HBTV (µg/m3)	1.10E+01	HBTV (ppbv)	1.33E+00
Percent of Total Volatiles in Air	1.00E+02	Response Level (µg/m3)	1.10E+01	Response Level (ppbv)	1.33E+00
Soil Concentration (mg/kg)	4.00E+01	Response Level (µg/m3)	1.50E+02	Value Exceeds NAAQS of 150 ug/m3; therefore, value defaults to NAAQS limit	

Reset Values | Reset Chemicals | Reset All | Print | Go to User's Guide





How to Use the Calculator (Cont.)

Site Name:	Big Corp LLC	Averaging Time (year)	Exposure Time (hours/24 hours)	Exposure Frequency (days/365	Exposure Duration (year)	Number of Contaminants (Up to 4)
Site PI #:	123456					
Evaluated by:	Leonard S. R. Pindleton					
Date:	January 24, 2024	1 (NC), 70 (C)	8	30	1	4

Naphthalene			91-20-3	For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.	
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E+00	HBTV (µg/m3)	1.10E+02	HBTV (ppbv)	2.09E+01
Percent of Total Volatiles in Air	4.00E+01	Response Level (µg/m3)	2.74E+02	Response Level (ppbv)	5.22E+01
Soil Concentration (mg/kg)	5.00E+00	Response Level (µg/m3)	1.50E+02	Value Exceeds NAAQS of 150 ug/m3; therefore, value defaults to NAAQS limit	

Benzene			71-43-2		
Analyzed as Volatile					
Inhalation Reference Concentration (µg/m3)	3.00E+01	HBTV (µg/m3)	1.10E+03	HBTV (ppbv)	3.43E+02
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+03	Response Level (ppbv)	3.43E+02

Mercury (total)			7439-97-6	For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.	
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E-01	HBTV (µg/m3)	1.10E+01	HBTV (ppbv)	1.33E+00
Percent of Total Volatiles in Air	1.00E+02	Response Level (µg/m3)	1.10E+01	Response Level (ppbv)	1.33E+00
Soil Concentration (mg/kg)	4.00E+01	Response Level (µg/m3)	1.50E+02	Value Exceeds NAAQS of 150 ug/m3; therefore, value defaults to NAAQS limit	

Polychlorinated biphenyls (PCBs)			1336-36-3		
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Unit Risk Factor (µg/m3)-1	5.70E-04	HBTV (µg/m3)	4.48E+00	HBTV (ppbv)	Refer to User's Guide Section 5.2
Percent of Total Volatiles in Air	1.00E+01	Response Level (µg/m3)	4.48E+01	Response Level (ppbv)	Refer to User's Guide Section 5.2
Soil Concentration (mg/kg)	6.00E+01	Response Level (µg/m3)	1.50E+02	Value Exceeds NAAQS of 150 ug/m3; therefore, value defaults to NAAQS limit	

Reset Values | Reset Chemicals | Reset All | Print | ? | Go to User's Guide | Exit

Special Notes

NJDEP Perimeter Air Monitoring HBTV and Response Level Calculator

Site Name:	Big Corp LLC	Averaging Time (year)	Exposure Time (hours/24 hours)	Exposure Frequency (days/365	Exposure Duration (year)	Number of Contaminants (Up to 4)
Site PI #:	123456					
Evaluated by:	Leonard S. R. Pindleton					
Date:	January 24, 2024	1 (NC), 70 (C)	8	30	1	2

Acenaphthene			83-32-9
Analyzed as Particulate			
No RfC/IUR Available for This Contaminant	Not Available	HBTV (µg/m3)	Appropriate Toxicity Value Not Available, Choose a Surrogate or Consult with Department
Soil Concentration (mg/kg)		Response Level (µg/m3)	Not Available

Polychlorinated biphenyls (PCBs)		1336-36-3			
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Unit Risk Factor (µg/m3)-1	5.70E-04	HBTV (µg/m3)	4.48E+00	HBTV (ppbv)	Refer to User's Guide Section 5.2
Percent of Total Volatiles in Air		Response Level (µg/m3)	4.48E+00	Response Level (ppbv)	Refer to User's Guide Section 5.2
Soil Concentration (mg/kg)		Response Level (µg/m3)	4.48E+00		

For some contaminants, the HBTVs and/or response levels cannot be calculated. Please contact the Department for assistance.

Test Your Knowledge

Poll #2

A Health-Based Threshold Value (HBTV) is:

A. contaminant-specific
B. calculated air concentration averaged over the workday
C. assumed protective of human health for offsite receptors
D. all of the above

Poll #2

A Health-Based Threshold Value (HBTV) is:

A. contaminant-specific
B. calculated air concentration averaged over the workday
C. assumed protective of human health for offsite receptors
D. all of the above

PAM Calculator User's Guide

January 23, 2024

Amanda Gettelfinger, Research Scientist
Bureau of Environmental Evaluation and Risk Assessment
Contaminated Site Remediation & Redevelopment

Purpose and Contents of User's Guide

- **Purpose -** To provide instruction on developing Health-Based Threshold Values and response levels for site-specific contaminants

- **Contents:**
  1. Standard Operating Procedures
  2. Calculator Scope
  3. Health-Based Threshold Values
  4. HBTV Equations
  5. Response Levels
  6. Measuring Protectiveness of Response Levels
  7. Response Level Equations

Contents of User's Guide

Contents:

1. Standard Operating Procedures – discusses calculator input parameters (e.g., 20-225 working days) and how to run calculator

2. Calculator Scope – discusses the calculator outputs (HBTV, response level)

3. Health-Based Threshold Values – defines HBTV and its purpose

4. HBTV Equations – provides different equations used to derive contaminant-specific HBTVs

Contents of User's Guide (Cont.)

Contents:

5. Response Levels – defines response level and discusses how to calculate them; provides examples of different surrogates; discusses contaminant-specific exceptions; discusses time-weighted averages

6. Measuring Protectiveness of response levels – discusses role of confirmatory sampling to demonstrate response levels are protective of HBTVs; details steps to follow if confirmatory samples indicate HBTVs are being exceeded

7. Response Level Equations – provides different equations used to derive contaminant-specific response levels

User's Guide Functions

NJDEP Perimeter Air Monitoring HBTV and Response Level Calculator

		Averaging Time (year)	Exposure Time (hours/24 hours)	Exposure Frequency (days/365	Exposure Duration (year)	Number of Contaminants (Up to 4)
Site Name:						
Site PI #:						
Evaluated by:						
Date:		1 (NC), 70 (C)	8	30	1	4

Mercury (total)			7439-97-6		
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E-01	HBTV (µg/m3)	1.10E+01	HBTV (ppbv)	1.33E+00
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+01	Response Level (ppbv)	1.33E+00
Soil Concentration (mg/kg)		Response Level (µg/m3)	1.10E+01		

For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.

Benzene			71-43-2		
Analyzed as Volatile					
Inhalation Reference Concentration (µg/m3)	3.00E+01	HBTV (µg/m3)	1.10E+03	HBTV (ppbv)	3.43E+02
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+03	Response Level (ppbv)	3.43E+02

Polychlorinated biphenyls (PCBs)			1336-36-3		
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Unit Risk Factor (µg/m3)-1	5.70E-04	HBTV (µg/m3)	4.48E+00	HBTV (ppbv)	Refer to User's Guide Section 5.2
Percent of Total Volatiles in Air		Response Level (µg/m3)	4.48E+00	Response Level (ppbv)	Refer to User's Guide Section 5.2
Soil Concentration (mg/kg)		Response Level (µg/m3)	4.48E+00		

Naphthalene			91-20-3		
Provide Justification for Analyzing as Volatile or Particulate					
Inhalation Reference Concentration (µg/m3)	3.00E+00	HBTV (µg/m3)	1.10E+02	HBTV (ppbv)	2.09E+01
Percent of Total Volatiles in Air		Response Level (µg/m3)	1.10E+02	Response Level (ppbv)	2.09E+01
Soil Concentr...		Response Level (µg/m3)	1.10E+02		

For further guidance regarding analyzing CoCs as volatiles or particulates, refer to the User's Guide, Section 5.2.

Reset Values | Reset Chemicals | Reset All | Print | ? | Go to User's Guide | Exit

User's Guide Functions (Cont.)

User's Guide

1. Enter the Site name, PI #, the name of person conducting the evaluation, and the date.
2. Enter the number of hours per day and days per year.
3. Select the number of chemicals that need an HBTV and Initial Response Level.
4. Select the chemicals from the drop-down list(s).
5. Enter the soil concentration or percent of total volatiles for each chemical, as appropriate.
6. Print results.

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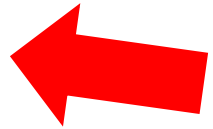
Return to Calculator



User's Guide Functions (Cont.)

2. Calculator Scope

The NJDEP Perimeter Air Monitoring (PAM) Calculator is used to aid in calculating the HBTV and Response Level for a given contaminant at a remediation site. The HBTV is a calculated air concentration that is protective of human health for off-site receptors. The HBTV is calculated from selected chemical specific toxicity reference values and site-specific exposure assumptions (e.g., expected duration of the remedial activities having the potential for causing air emissions, hours worked per day, etc.). The response level is derived from the HBTV input values and is calculated using site-specific soil data. The response level is a concentration of a contaminant that is present as a vapor and/or particulate matter (PM10) which, if exceeded, acts as a threshold that dictates when additional actions should be taken to reduce vapors/particulate matter for the protection of receptors.

Please be advised that the HBTV and response level values calculated using this resource are suggested concentrations that are not to be exceeded. More stringent HBTVs and response level values may be used if they are required to ensure receptor or public safety/health or to address other receptor and public concerns. The HBTVs and response levels may also be adjusted throughout the PAM process as confirmatory analytical data become available.

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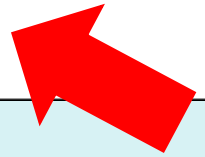
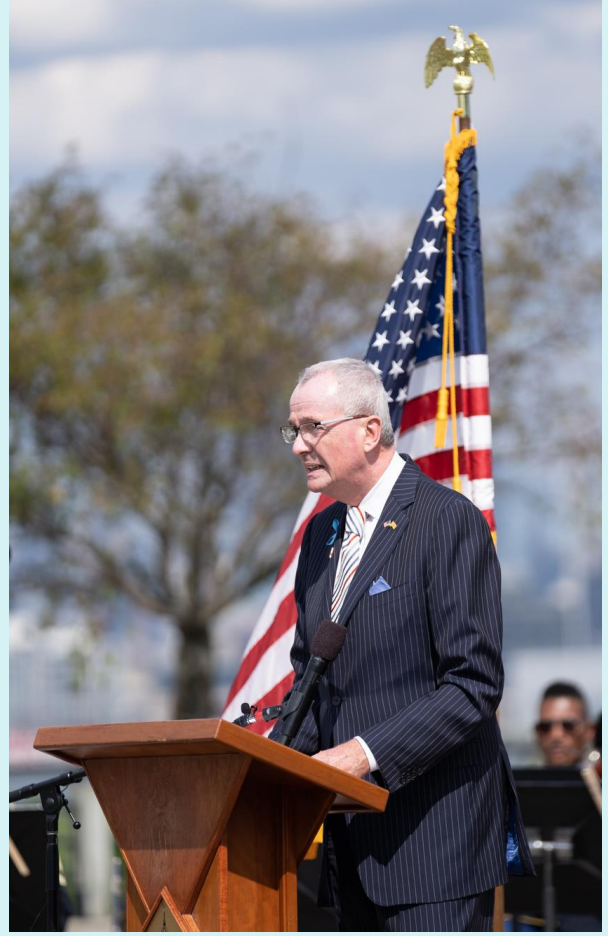




Thank you!

Perimeter Air Monitoring Technical Guidance Training Day 1 of 2

January 23, 2024

Questions?

PAM Steps 4 and 5

January 23, 2024

Bruce D. Groves, CIH
Emilcott/Triumvirate Environmental

Step 4: Identify Monitoring Methods and Technologies- Identify Monitoring Strategy

Identify Monitoring Strategy

- Type, quantity, and quality of measurements to be made, consistent with established Data Quality Objectives (DQOs)
- To provide real-time data in controlling and reducing emissions to prevent adverse offsite exposures to the public
- To corroborate that real-time data and associated response levels are adequate in meeting HBTVs
- To document that the PAM program is working as designed and is protecting the public

Step 4: Identify Monitoring Methods and Technologies- Identify Monitoring Strategy (Cont.)

- The type of remedial technologies selected;
- The source-receptor relationship;
- The list of COCs identified in Step 1;
- The HBTVs developed in Step 3; and
- The real-time technology for specific COCs and document HBTV exceedances

Monitoring Strategy

The type of remedial technologies selected

Monitoring Strategy

The source/receptor relationship

Step 4: Identify Monitoring Methods and Technologies- Identify Monitoring Strategy (Cont.)

- The list of COCs identified in Step 1
- The HBTVs developed in Step 3
    - Benzene
    - Trichloroethylene (TCE)
    - Hexavalent chromium (Cr_6)
    - Lead (Pb)

Monitoring Strategy

The real-time technology for specific COCs and document HBTV exceedances

Step 4: Identify Monitoring Methods and Technologies- Select Air Monitoring Methods and Technologies

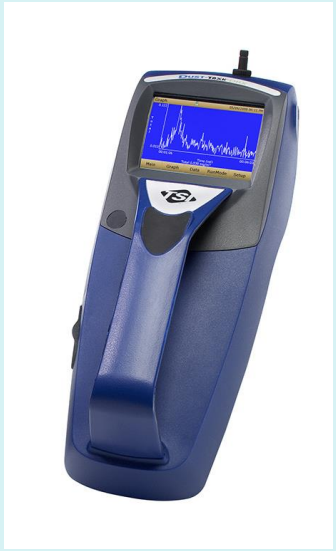
Select Air Monitoring Methods and Technologies

Real-Time Monitoring

- Handheld real-time monitoring
- Stationary or mobile real-time monitoring
- Meteorological monitoring

Select Monitoring Methods and Technology

Handheld



Select Monitoring Methods and Technology

Stationary or Mobile

Select Monitoring Methods and Technology

Meteorological

Test Your Knowledge

Poll #3

A real time monitor is equipment that:

A. can measure total concentration for group of contaminants
B. can be handheld or fixed
C. can display instantaneous concentration readings
D. all of the above

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Step 4: Identify Monitoring Methods and Technologies- Select Air Monitoring Methods and Technologies (Cont.)

Confirmatory Measurements: Sample Collection and Laboratory Analysis

- The verification of the underlying assumptions, on which the real-time monitoring program is based, requires analytical measurements (e.g., TO-15 for volatiles) of specific COCs
- Method Detection Limits (MDLs) and sensitivity versus HBTVs

Laboratory Method and Certification

- EPA, National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), others
- NJDEP certification
- For exceptions – contact the Department

Step 4: Identify Monitoring Methods and Technologies- Select Air Monitoring Methods and Technologies (Cont.)

Confirmatory Sampling Considerations

- Analytical results from confirmatory sampling should be compared directly to the HBTVs calculated for each site-specific COC
- Frequency - initial/periodic/other
  - e.g. 3 days initially
  - Hotspots
  - Change in remediation methods and/or locations
- Using data to validate or change monitoring reporting limits and/or frequency of confirmatory sampling

Step 4: Identify Monitoring Methods and Technologies- Select Air Monitoring Methods and Technologies (Cont.)

Chemical-Specific Concerns

- Mercury (Hg)
- Polychlorinated Biphenyls (PCBs)
- Naphthalene

Step 5: Identify Sampling & Monitoring Locations and Schedule

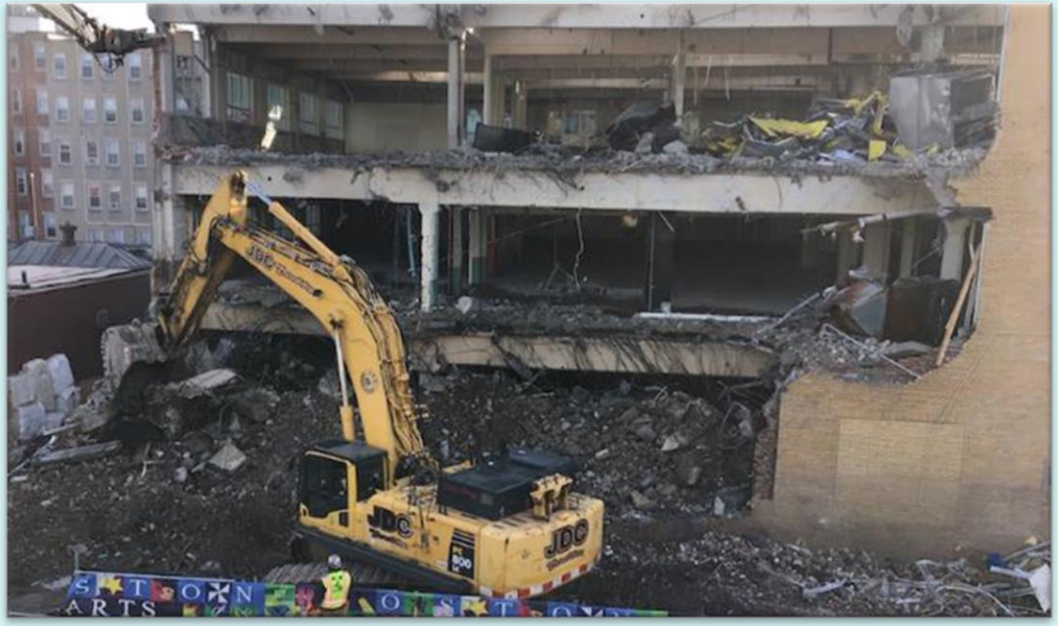
Considerations:

- The locations where air monitoring and sampling will occur;
- The frequency of monitoring and sample collection;
- How data will be collected and stored; and
- Whether additional specialized monitoring (e.g., radiation) will be necessary

Step 5: Identify Sampling & Monitoring Locations and Schedule (Cont.)

- Air Sampling and Monitoring Locations
- Fixed vs. Mobile Air Sampling and Monitoring Locations
- Frequency of Monitoring and Air Sample Collection at Each Location
- Air Monitoring and Sampling Station Specifications
- Ancillary Meteorological Data
- Determining the Need for Additional Monitoring Procedures
- Background Sampling

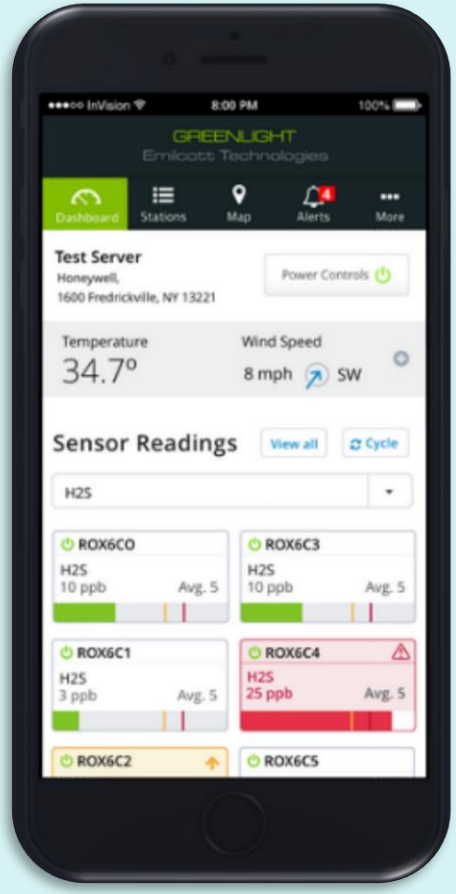
Locations

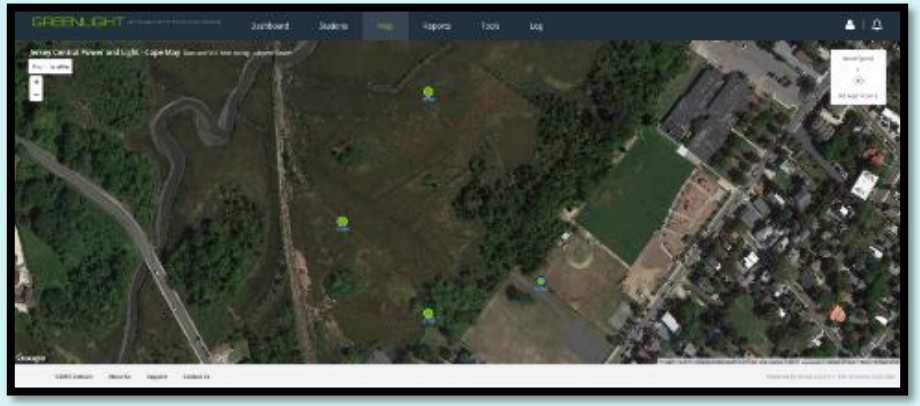


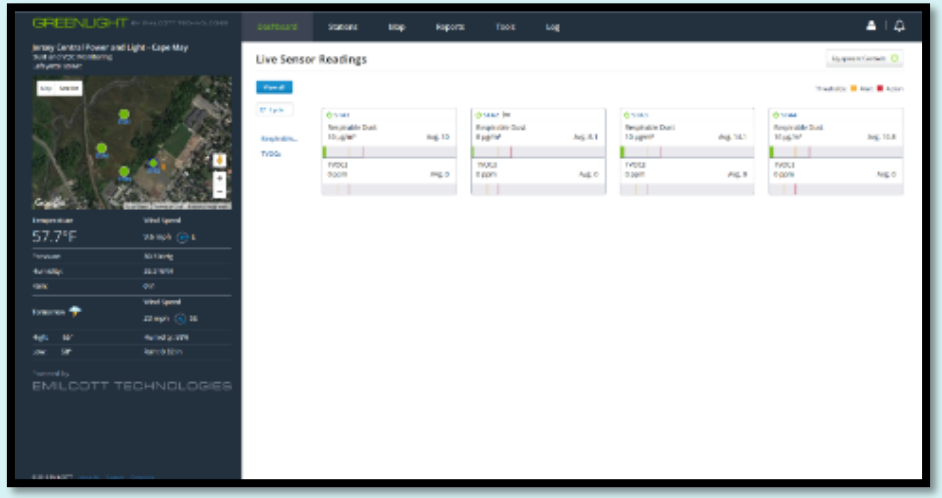
Fixed vs. Mobile Locations

Frequency of Monitoring & Sampling

Station Specifications





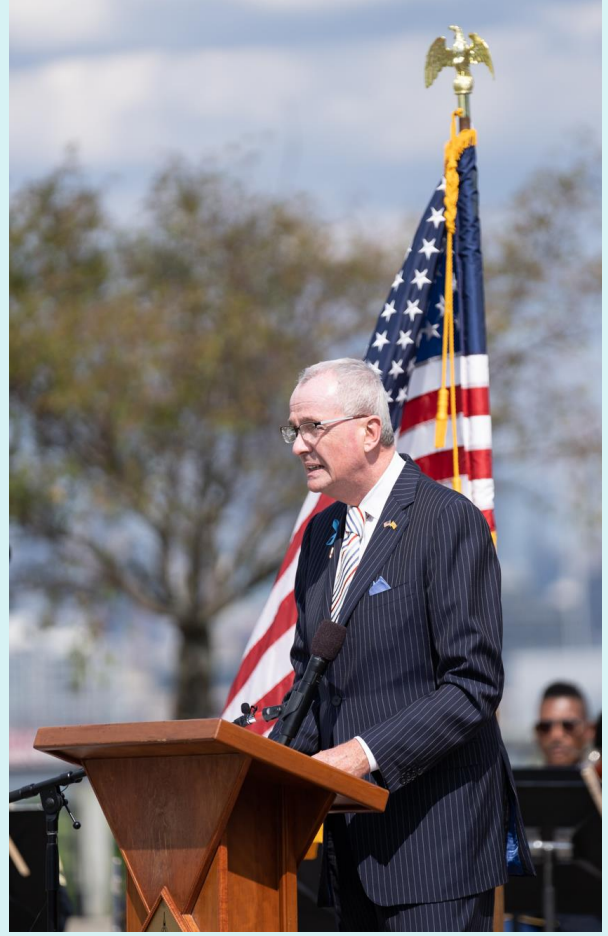


Ancillary Met Data

Step 5: Identify Sampling & Monitoring Locations and Schedule (Cont.)

- Determining the need for additional monitoring procedures

- Background sampling



Thank you!

Perimeter Air Monitoring Technical Guidance Training Day 1 of 2

January 23, 2024

Questions?

Remember!

Day 2 of the Perimeter Air Monitoring (PAM) training will be held tomorrow,

January 24th, 2024 from 9am- 12pm

You must register for day 2 separate from today's training!

To Register for day 2:

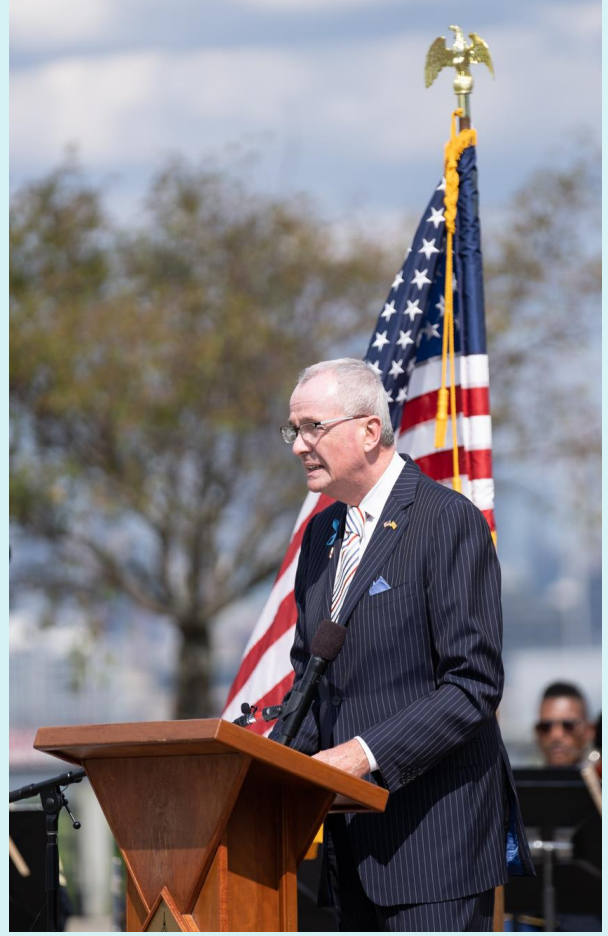
https://attendee.gotowebinar.com/register/6565538406766491742

Please fill out the Course Evaluation here:

https://www.surveymonkey.com/r/RNRCJPK

Reminders!

- Questions not answered today will be answered via email in the coming weeks
- Look out for an email from the LSRPA for CEC certificate access
- Slides and presentation will be posted on the CSRR Training page



Thank you!