

# **PART I**

## **BACKGROUND**



# Chapter 1 Overview of Volume 3

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## 1.0 Preface

This resource document is the third in the Air Toxics Risk Assessment (ATRA) Library series. It presents an overview of the overall process and tools for evaluating cumulative risk from multiple air toxics emitted from sources at the community level and developing and implementing risk reduction activities to bring about meaningful environmental change. The first portion of the book is geared towards one type of toxics issue – understanding and mitigating the risks posed to human health by the simultaneous impact of multiple air toxics emissions sources on a specific geographic location. (Approaches for assessing the impact of multiple sources on ecological receptors are discussed in Part III of this book and in ATRA Volume 1, Part IV.<sup>(a)</sup>) The second part of this book expands on the issue of community toxics by focusing on the other types of environmental pollution issues that a community may face such as lead paint in homes, contaminated surface water, and pesticides use.

There are many ways to conduct community toxics projects and the specific approach selected in a community will often reflect a balance between the complexity of the problem being evaluated, the uncertainties in the assessment that can be tolerated, and the resources available to do the work. As such, the tools and techniques described in this document should not be viewed as prescriptive; rather, they should be viewed as a guide to available approaches that could be used by practitioners in the field of risk analysis and risk mitigation. The chapters use non-mandatory language such as “may” and “should” to indicate that the information provided is recommended, but does not impose any legally binding requirements. (Interested parties are free to raise questions and objections about the substance of this guidance and the appropriateness of the application of this guidance to a particular situation. EPA and other decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from those described in this guidance where appropriate.)

### A Note on Terminology

The terms “**air toxics**” and “**toxic air pollutants**” are often used interchangeably with “**hazardous air pollutants**” (which is a Clean Air Act phrase specific to the 187 pollutants that are the focus of section 112 of the Act – see <http://www.epa.gov/ttn/atw/188polls.html>).<sup>\*</sup> For the purposes of this reference library, however, the term “air toxics” is used in the more general sense to refer to any air pollutant (other than criteria pollutants) that has the potential to cause adverse impacts to human health or the environment.

“**Criteria air pollutants**” are six common air pollutants determined to be hazardous to human health and for which EPA has established National Ambient Air Quality Standards (NAAQS). The six criteria air pollutants are carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, and particulate matter. A detailed discussion of criteria pollutants is available at <http://www.epa.gov/air/urbanair/6poll.html>.

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<sup>\*</sup>**A Hazardous Air Pollutant (HAP)** is defined under the Clean Air Act as a pollutant that causes or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects. Currently, the Clean Air Act regulates 187 chemicals and chemical categories as HAPs.

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<sup>a</sup> The information provided here augments ATRA Volumes 1 and 2 by providing information tailored to multisource air toxics assessments. The reader may wish to refer back to the information provided in Volumes 1 and 2 for further explanations of some of the concepts found in this document.

## 1.1 Intended Audience

Community-scale multisource cumulative assessments and risk reduction efforts are often a joint partnership between regulatory agencies and various stakeholders in the communities where the study is taking place. With that in mind, Volume 3 was developed for the following two key audiences:

- Federal and state, local, and tribal (SLT) air agencies who either conduct, review, or otherwise participate in community-scale multisource air toxics assessments.
- Various community stakeholders who participate in the community-scale air toxics assessment process.

Should a community-scale toxics reduction effort expand beyond air toxics issues (for example, to water or solid waste concerns), the number and types of interested stakeholders will likely grow beyond those listed above.

### **Why Are Non-Air Toxics Issues Included in a Book about Multisource Air Toxics Risk Assessment? Why Is a Range of Technical Approaches Provided?**

Even though their overall intention is to focus on toxic air pollutants, many partnership teams performing a community-scale multisource assessment will sometimes be drawn into addressing other non-air environmental issues. To aid them in this work, Part IV of this document discusses some suggested approaches for identifying and implementing risk reduction projects for common non-air environmental toxics issues at the community level. (In some cases, a community may want to focus solely on these other non-air toxics issues, making their interest in this Volume limited to Part IV.)

Given that the interests and available resources, expertise, and time to perform an analysis (of any sort) may vary dramatically from community to community, this volume attempts to present a range of possible approaches for identifying and addressing community environmental toxics issues. In a multisource air toxics risk assessment, for example, an aggressive technical analysis may be possible that provides a high degree of certainty about community risk and the main contributors to that risk. In other cases, the community's interests or resources may lead to a more limited air toxics assessment effort. Likewise, the assessment of additional toxics issues may be more or less qualitative or quantitative depending on the interests and resources of the community. In many cases, the approach taken will be a combination of quantitative and qualitative. Ultimately, the needs of the partnership team and the resources they have to perform their work will drive the type of analysis they do and the environmental risk factors on which they focus. It is with such possibilities in mind that this volume discusses both complex technical approaches and more straightforward qualitative analyses.

## 1.2 Relationship to Volumes 1 and 2

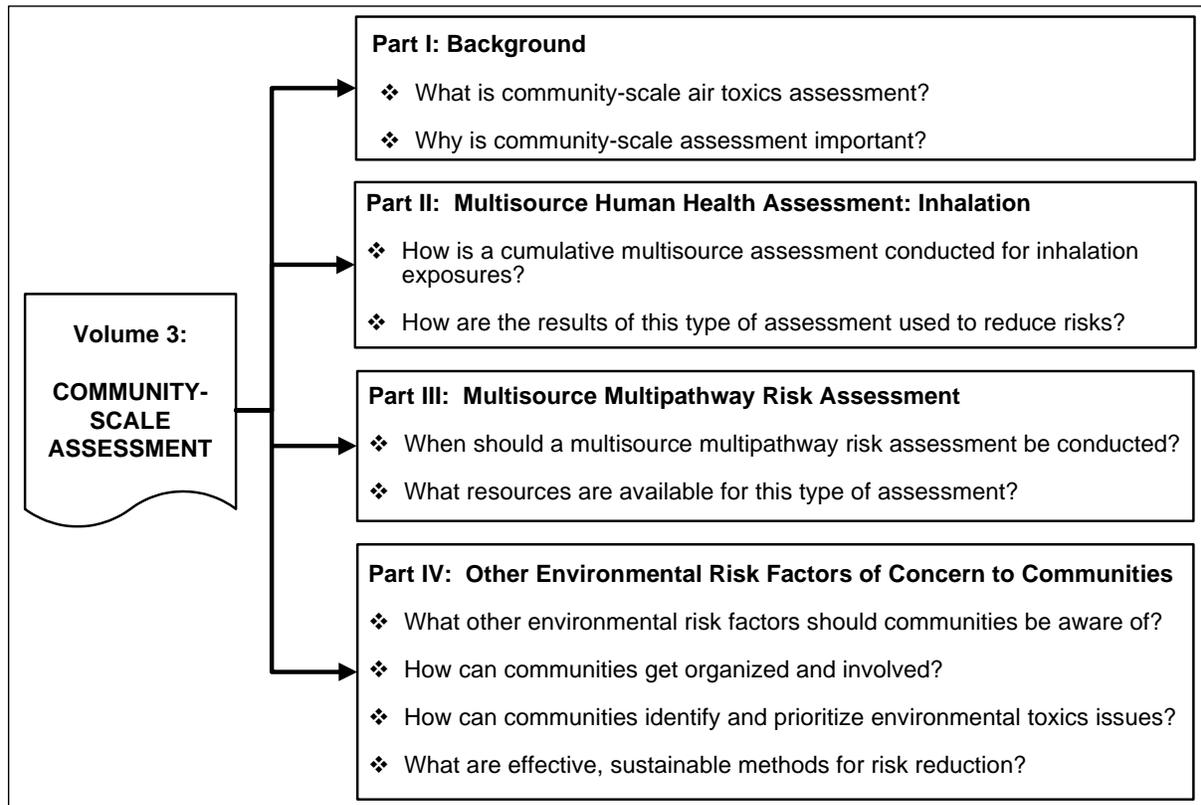
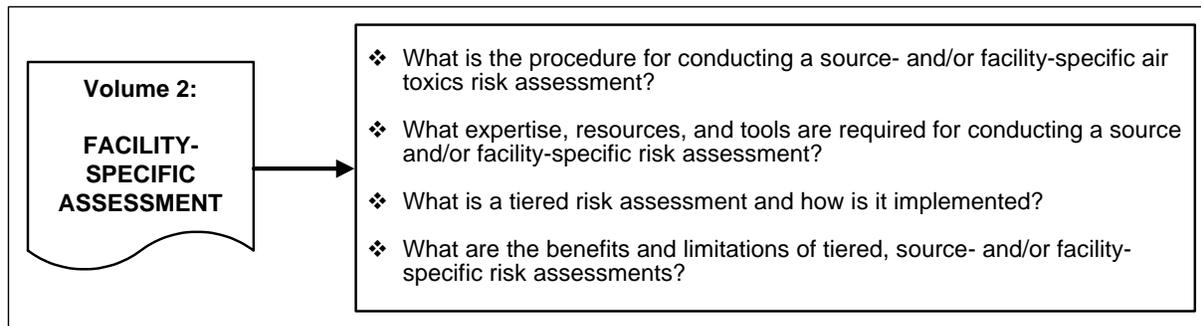
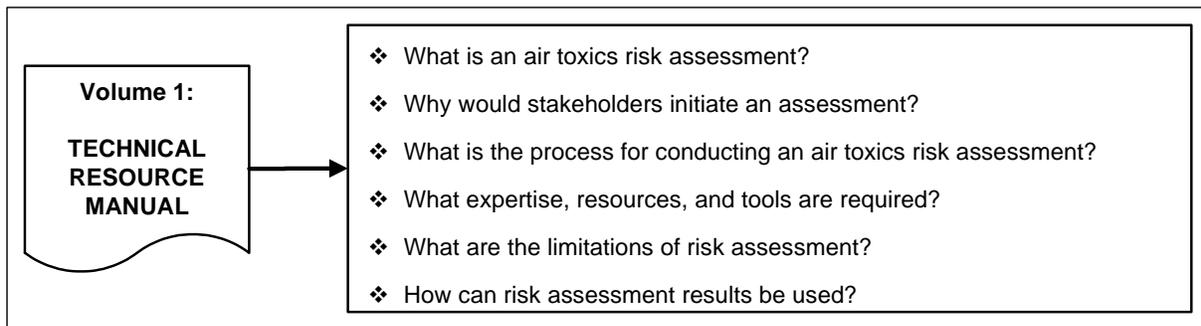
This resource document is the third in the ATRA Library series. A brief description of the three-volume ATRA Library series is presented below and summarized in Exhibit 1-1.

**Volume 1: Technical Resource Manual** discusses the overall air toxics risk assessment process and the basic technical tools needed to perform these analyses. The manual addresses both human health and ecological assessment. It also provides a basic overview of the process of managing and communicating risk assessment results. Other types of evaluations (such as the public health assessment process) are described to give the community a more holistic understanding of the many issues that may come into play when evaluating the potential impact of air toxics on human health and the environment. *Readers new to the field of risk assessment or those needing more detailed information on the science of risk assessment are encouraged to consult ATRA Volume 1 at [http://www.epa.gov/ttn/fera/risk\\_atra\\_vol1.html](http://www.epa.gov/ttn/fera/risk_atra_vol1.html).*

**Volume 2: Facility-Specific Assessment** builds on the technical tools described in ATRA Volume 1 by providing an example set of tools and procedures that can be used for source-specific or facility-specific risk assessments. Information is also provided on tiered approaches to source- or facility-specific risk analysis. Volume 2 can be found at [http://www.epa.gov/ttn/fera/risk\\_atra\\_vol2.html](http://www.epa.gov/ttn/fera/risk_atra_vol2.html).

**Volume 3: Community-Scale Assessment** (this volume) builds on the information presented in ATRA Volume 1 to describe approaches to evaluate and reduce air toxics risks posed by emissions from multiple sources at the local level. It includes information on screening level and more detailed analytical approaches, approaches to balance the need for assessment versus the need for action, approaches to identify and prioritize risk reduction options, and approaches to measure the success of risk reduction efforts. Since community environmental concerns and issues are often not limited to air toxics, this volume also presents information on additional environmental risk factors that may affect communities as well as strategies to reduce those risks. The document also provides additional information on stakeholder involvement, communicating information in a community-based setting, and developing the resources to fuel the effort.

**Exhibit 1-1. Summary Diagram of Volumes 1, 2, and 3 of the Air Toxics Risk Assessment Reference Library**



### **Volume 3 and the *Community Air Screening How To Manual*: What's the Difference?**

A companion document to Volume 3 is EPA's *Community Air Screening How To Manual* developed by EPA's Office of Pollution Prevention and Toxics (OPPT; see <http://www.epa.gov/opptintr/cahp/catt.html>). Volume 3 of the ATRA Reference Library builds on and is complementary to the *How To Manual*. Specifically, the *How To Manual* provides information for communities on how to organize and develop a risk-based *screening-level evaluation* of air toxics in their local area. In contrast, Volume 3 provides a more comprehensive discussion of approaches to cumulative, multi-source air toxics risk assessment and the tools for performing it, as well as a discussion of source apportionment of toxic air pollutant impacts on a local area. Additionally Volume 3 includes discussions of multipathway analyses and ranking air toxics and other community risk factors for risk management purposes.

Depending on the needs of the community partnership team, they may choose to perform only a screening-level analysis (e.g. using the *How To Manual* approach) or they may opt to begin with the risk assessment approach outlined in Volume 3. In many cases, the partnership team will begin with a screening-level analysis to identify the important chemicals and sources that will be a focus of the cumulative risk assessment.

Volume 3 also provides general background information on screening-level techniques that are commonly used as a prelude to a cumulative risk assessment. However, analysts are encouraged to become familiar with both the *How To Manual* and the contents of this document in order to better understand the available tools and techniques for screening analysis and the interplay between screening-level assessments and more detailed risk assessment approaches. The *How To Manual*, or parts of the *How To Manual*, written for a broad partnership audience, also can be used for education and training purposes in general. More information on the *How To Manual* is provided in Section 3.5.1.

### **1.3 Overview of the Document's Structure and Content**

As noted above, Volume 3 builds on the information already provided in Volume 1 of the ATRA Library, and readers will generally find that Volume 3 focuses on information not already covered in ATRA Volume 1. For those subjects already covered in detail in ATRA Volume 1, pointers are provided back to the relevant sections of that document where more in-depth information is available.

Volume 3 is divided into four parts:

**Part I (Background)** presents an introduction to this document and the concept behind community-scale multisource cumulative assessments.

- **Chapter 1** (this chapter) describes the purpose of this document, its intended audience, its relationship to Volumes 1 and 2 of this series, and its structure and content.
- **Chapter 2** provides an introduction to community-scale air toxics assessment and other potential environmental community health concerns, the importance of localized assessment and risk reduction, and stakeholder involvement.

### The Overall Framework of Volume 3

**Part I** of this document introduces readers to the types of **environmental toxics** issues that many communities face, include toxics in air, soils, water, and consumer products.

**Part II** of this document focuses on one type of environmental toxics problem – **inhalation** (i.e., breathing in) of toxic pollutants in the air. This part presents ways to assess the combined risk posed by the potentially multiple sources of pollution which may be simultaneously impacting a community along with ways to identify the main sources and chemicals responsible for any unacceptable risks found.

**Part III** of this document discusses the movement of air toxics out of the air and into soils, sediments, water, and living tissue where it can be contacted by living organisms (e.g., by ingesting contaminated food, drinking contaminated water, or touching contaminate soils) and potentially cause harm. This discussion of **multipathway risk** focuses on both the people in a community and the community's ecosystem.

**Part IV** provides insight into the variety of additional environmental toxics issues (other than air toxics) that a community may be concerned about, along with approaches to prioritizing the concerns as well as ways to reduce risk and sustain the effort over time.

All of these efforts will need strong support and participation by many types of people in the community and may require technical experts to be brought in from outside. Community participation and the need for technical expertise is discussed at various points throughout this document.

**Part II (Human Health Assessment: Inhalation)** provides an overview of available tools and approaches for conducting a community-scale multisource cumulative assessment.

- **Chapter 3** discusses the potential need for or usefulness of an assessment, the use of modeling and monitoring to estimate exposure, and examples of community-scale assessments and methodologies. This chapter also discusses how to balance the need for action with the need for analysis.
- **Chapter 4** describes the initial planning, scoping, and problem formulation steps of the risk assessment. Several key elements are highlighted, including identifying the concern(s) to be evaluated (usually by an analysis of existing data), determining the scope of the analysis, developing a conceptual model of the study area, developing a written plan for how the analysis will be carried out, and how to revise the approach as needed.
- **Chapter 5** describes the analysis phase of the multisource assessment, including emissions characterization, air dispersion modeling, quantifying inhalation exposure, and toxicity assessment.
- **Chapter 6** describes how to combine exposure information with toxicity data to quantify risk. This chapter also discusses how to apportion the risks among the sources and chemicals evaluated and how to assess the uncertainties associated with the overall assessment.

- **Chapter 7** describes risk communication, including methods for presenting risk results and understanding and presenting trends in risk over time.
- **Chapter 8** describes the process for identifying, prioritizing, and selecting risk reduction options for sources of air toxics emissions, including legal considerations, implementation issues, and how to monitor progress and sustain efforts over time.

**Part III (Multisource Multipathway Risk Assessment)** provides a brief discussion on assessing the impact of air toxics in other media on human health and the environment (e.g., mercury deposition with subsequent uptake in fish).

- **Chapter 9** describes key concepts and available tools and techniques.

**Part IV (Other Environmental Risk Factors of Concern to Communities)** describes how to put the results of the air toxics assessment in context with other community environmental risk factors and how to identify, prioritize, select, and implement risk reduction approaches for these additional concerns.

- **Chapter 10** describes the background of community risk reduction projects, how to form a partnership team to do the work, and how to involve and communicate with the larger community.
- **Chapter 11** describes how to identify and prioritize environmental concerns other than air toxics, including sources of available data and methods for prioritizing risk factors.
- **Chapter 12** describes how to identify, select, and implement risk reduction projects, including risk reduction approaches, legal considerations, implementation issues, assessing the success of the risk reduction efforts, and sustaining the process over time. This chapter also discusses how to fill important data gaps.

Several **Appendices** provide more detailed discussion of various topics.

- **Appendix A** provides several case studies. The first group of case studies illustrates the multisource cumulative assessment approach. The second set of case studies illustrates how to identify, assess, and address other environmental issues of concern to communities.
- **Appendix B** provides background information on air toxics screening level approaches.
- **Appendix C** presents the emissions inventory database structure for RAIMI (the Regional Air Impact Modeling Initiative).
- **Appendix D** provides a glossary of key terms used in this document.