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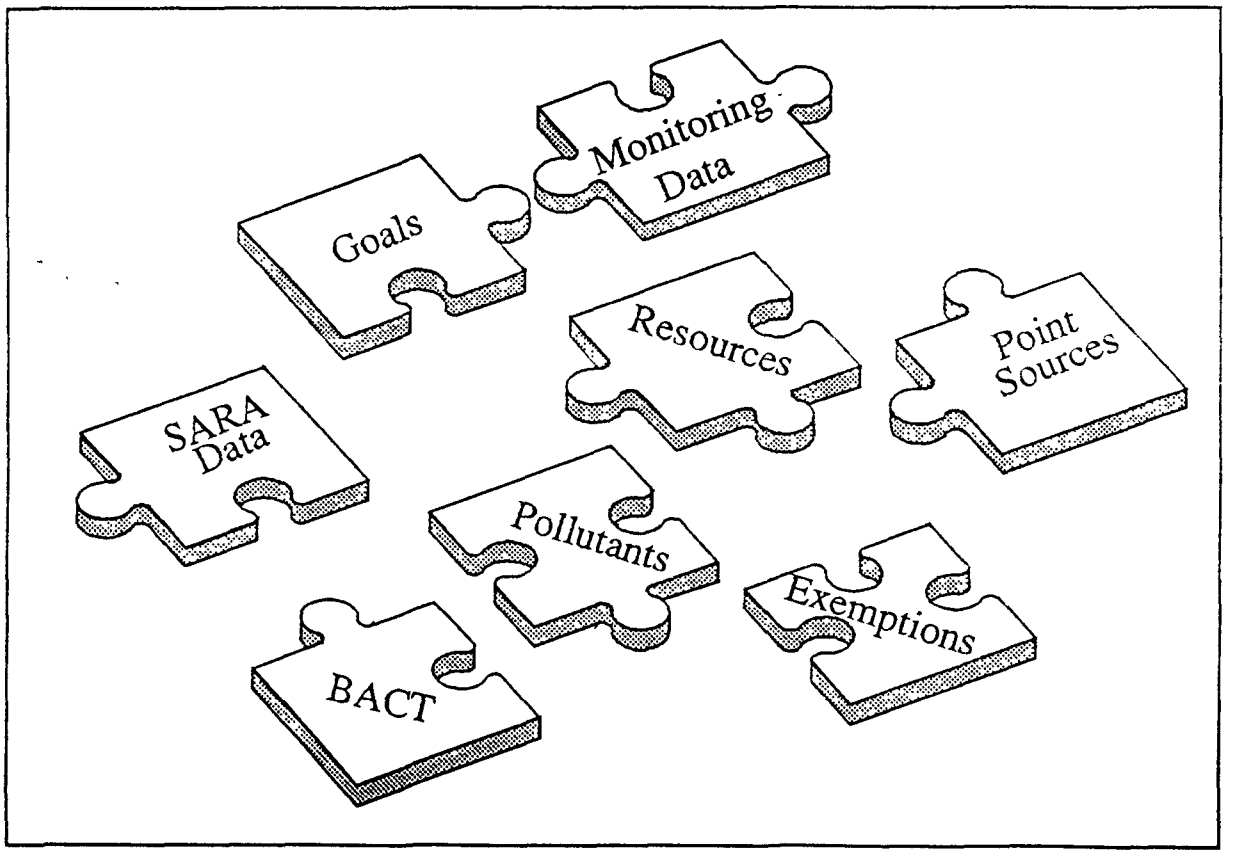
Designing and Implementing an Air Toxics Control Program:

A Program Development Manual for State and Local Agencies



DESIGNING AND IMPLEMENTING AN AIR TOXICS CONTROL PROGRAM:

A PROGRAM DEVELOPMENT MANUAL FOR STATE AND LOCAL AGENCIES

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July 1990

FOREWORD

This program development manual was prepared by the U. S. Environmental Protection Agency (EPA) at the request of the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (STAPPA/ALAPCO). The manual is intended to assist State and local (S/L) air pollution control agencies in making informed decisions about the development of air toxics control programs and to enhance consistency among S/L program approaches. In particular, insight is provided into how to make critical decisions regarding program scope and stringency, evaluation of program impacts, and achievement of overall program effectiveness. While the information contained in this manual does not represent EPA policy, it should prove useful to many S/L agencies now actively engaged in air toxics program development.

In order to develop the manual, the advice and experience of S/L agencies at various stages in their own program development were sought and incorporated into this manual. The State of Maryland, currently in the implementation phase of their air toxics program, provided advice and information based on the State's own experience with program design. The States of Colorado and Illinois, currently taking on the challenges of planning air toxics programs, helped identify issues and decision points faced by States in the early stages of program development. The information in the manual attempts to address these issues by illustrating the experiences of S/L agencies and EPA in making air toxics program decisions.

The control of toxic air pollutants is a high priority for both S/L and EPA. Studies have revealed numerous sources of air toxics nationwide, including both point sources (e.g., smokestacks and process vents) and area sources (e.g., vehicles and other highly dispersed emission points). Data compiled under Section 313 of the Superfund Amendments Reauthorization Act show that 2.7 billion pounds of toxic chemicals are released to the air annually from industrial sources alone; many of the chemicals released are known or suspected cancer-causing agents.

In response to the air toxics problem, EPA developed and implemented the National Air Toxics Strategy in 1985. This policy calls for action on high risk point

sources, the complex mixture of pollutants in urban areas, and mobile sources. The strategy also strongly supports the development of S/L air toxic control programs as an important part of an overall national effort to reduce toxic air emissions. In particular, the strategy has a goal that each S/L agency develop a program capable of addressing high risk point sources and carry out any federally adopted rules. Support by EPA for achieving this goal includes development grants, technical assistance, operation of technical assistance centers, air quality monitoring programs, and guidance documents.

Since 1985, a majority of S/L air pollution control agencies have established programs to address their air toxics problems. A significant trend is a growing similarity in S/L air toxic programs. While some programs give somewhat greater emphasis to one control approach over another, virtually all programs today include a combination of at least two basic program elements: use of control technology and ambient impacts requirements. In fact, use of these mutually reinforcing control program elements has emerged as the predominant feature of S/L programs. For this reason, the manual uses this multi-element approach as the baseline for discussing approaches to control of toxic air emissions.

To date, most S/Ls have focused their regulatory efforts primarily on individual high risk point sources; thus, high risk point source control is the focus of the manual. However, both S/Ls and EPA recognize the importance of addressing the problems of area sources, motor vehicles, and other clusters of sources. Research and regulatory activities are ongoing in these areas. The emphasis of this manual on high risk point source control is not intended to minimize the importance of these other problem areas.

At the time this manual was developed, efforts were underway to amend the Clean Air Act. While the nature of these amendments will become increasingly clear, it is already clear that a substantial increase in the number of sources regulated under federal rule is expected. S/L agencies currently engaged in rule development should consider designing their programs to complement the anticipated control approach, source/pollutant applicability, and implementation framework set forth by the current legislative proposals. Accordingly, S/L agencies with developing programs are further

advised to consult with applicable EPA officials to incorporate the current best understanding of the future federal program.

The sections that follow include: Section 1.0, Designing the Basic Program Approach; Section 2.0, Making Critical Design Choices: Scoping the Program; Section 3.0, Evaluating Program Impacts; and Section 4.0, Avoiding Pitfalls.

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ACKNOWLEDGEMENTS

This manual represents a collaborative effort between the U. S. Environmental Protection Agency (EPA) and State and local (S/L) air pollution control agencies. Information and case examples presented in this manual were gathered from a variety of sources, including numerous contracts with S/L agencies over a long period of time. The EPA would like to specifically acknowledge the contributions of the State of Maryland whose personnel provided extensive input and assistance to EPA during the preparation of the manual. The EPA is also grateful to personnel from the States of Colorado and Illinois for reviewing and commenting on the manual several times prior to its publication.

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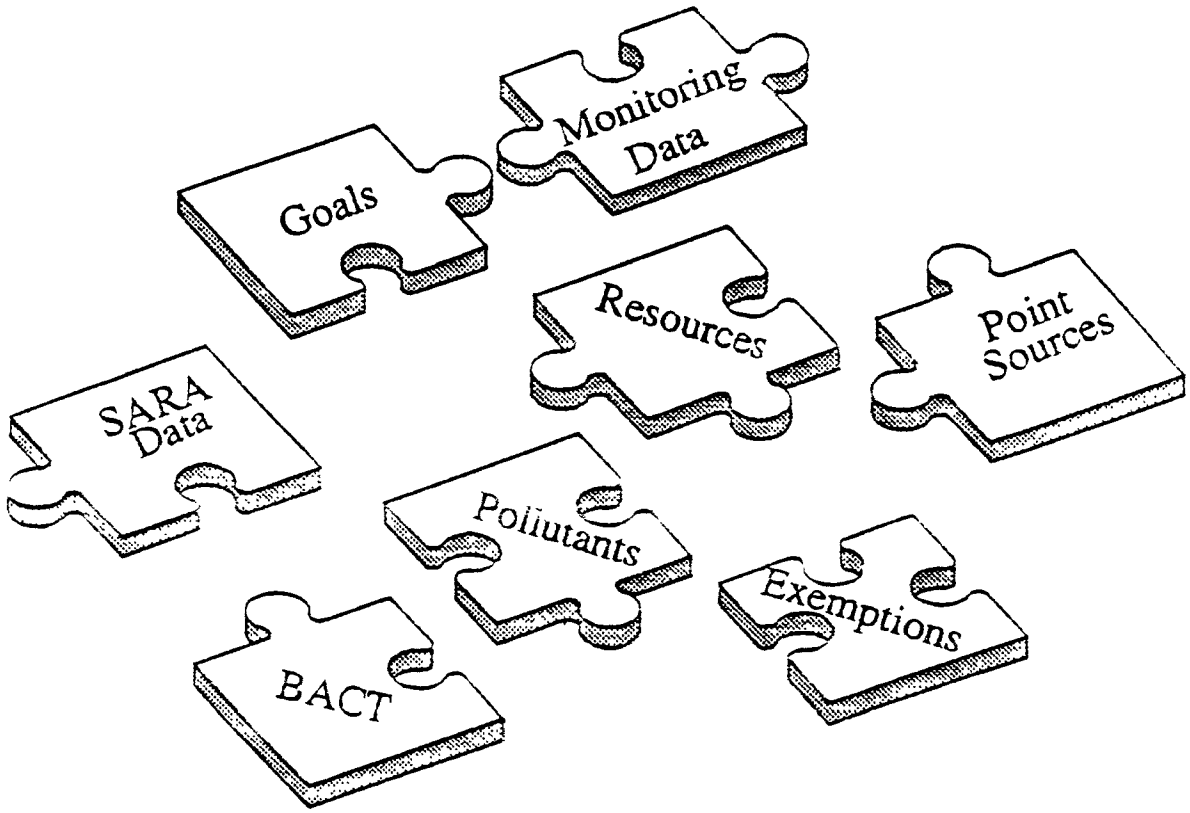
SECTION 1.0
DESIGNING THE BASIC PROGRAM APPROACH



1.0 DESIGNING THE BASIC PROGRAM APPROACH

Highlights of This Section

- Reasons for developing an air toxics program include prevention of future health problems, the need for a system to handle high risk sources, and a national policy supporting S/L program development.
- Air toxics program development begins with assessing the problem and designing the program; extensive data collection is not necessary to get started.
- Implementation, enforcement and evaluation follow.
- A comprehensive approach, combining control technology and ambient impacts requirements, is a good starting point for development of a long-term program.
- A comprehensive approach capitalizes on the best features of individual elements and provides flexibility for future changes.

1.1 DEVELOPING AN AIR TOXICS CONTROL PROGRAM

This subsection describes how State and local (S/L) agencies proceed from recognizing the need for additional air toxics control to designing and implementing a regulatory program. This subsection will be most useful to agencies just beginning a program.

1.1.1 Why Have an Air Toxics Program?

Understanding the need for an air toxics program is an important issue that should be addressed early. Some of the main reasons for developing a program include:

- Protection of Public Health - The primary goal of S/L pollution control agencies, and the basic argument in favor of an air toxics program, is the protection of public health. Studies associating air toxics with elevated cancer levels and other adverse health effects, as well as monitoring data and data from Title III of the Superfund Amendments Reauthorization Act (SARA Title III) showing large quantities of toxics being emitted, support the conclusion that there is an air toxics problem that needs to be addressed. The public's demand for clean air and protection from exposure to air toxics is also a basis for developing an air toxics program. Some S/L agencies have developed programs as a reactive or curative measure to address problems that already exist. Many S/L agencies now developing programs reason that the need to prevent future air toxics problems (and subsequent health risks) is a legitimate basis for justifying a program. This "preventative approach" to air toxics control allows agencies to act rather than react.

- National policy supporting S/L air toxics control programs - As mentioned in the Foreword, the National Air Toxics Strategy strongly supports S/L program development. This strategy was prompted by EPA studies suggesting potentially significant health risks from exposure to air toxics. The current Federal program will be strengthened with adoption of Clean Air Act amendments.

1.1.2 Defining the Problem and Designing the Program

In the early stages of program development, a S/L agency collects and evaluates information to define the specific tasks that must be completed to develop a program. At this point, the agency's list of action items might include:

- Defining the basic steps - The S/L agency should define the steps required to define the air toxics problem and design the air toxics program. The steps might include completing a review of legal authority, preparing of draft regulations or guidelines, and developing

a communication strategy to facilitate program approval and implementation.

- o Problem definition. A large data collection effort is not a prerequisite for defining the problem and, in fact, can deplete agency resources without achieving progress toward program approval. SARA Title III data and a point source screening survey may be enough to launch a program. If a preventative approach is adopted, little effort needs to be expended on documenting existing toxics-related health problems.

- o Identification of air toxics of concern - Some S/L agencies use an open-ended approach, regulating any noncriteria pollutants; others use a specific list. Identifying pollutants of concern can start with a review of various State and national lists (e.g., EPA's lists associated with proposed Clean Air Act amendments), or lists from the National Institute of Occupational Safety and Health (NIOSH), or the American Conference of Governmental Industrial Hygienists (ACGIH). These lists can be reviewed in conjunction with emission inventory or SARA Title III data. Some S/L agencies have undertaken chemical-specific health effects reviews, and selected chemicals based on these reviews.

- o Identification of air toxics sources - To define what sources will be included in the program, sources of air toxics emissions could be identified using source surveys, reviewing emission inventory or SARA Title III data, or reviewing various national databases that can help identify source categories of concern (see Section 2.2).

- o Review of agency legal authority - Where any questions exist as to whether or not the agency has the authority to regulate air toxics, confirmation of legal authority to regulate air toxics is recommended. Most S/L agencies have not needed additional legislative authority, and have undertaken policy or guidelines development or rulemaking via their general air pollution control authority.

- o Consideration of interim measures - Because program development requires a significant period of time, several S/L agencies implemented interim control strategies such as informally reviewing new and existing sources for toxics as they apply for construction and/or operating permits. Others have screened existing sources to help define the problem and encourage voluntary actions by problem sources. These interim measures can mitigate air toxics problems until a full program is in place, and can also build a valuable base of knowledge and operating experience.

Figure 1-1 summarizes key issues in the problem definition step.

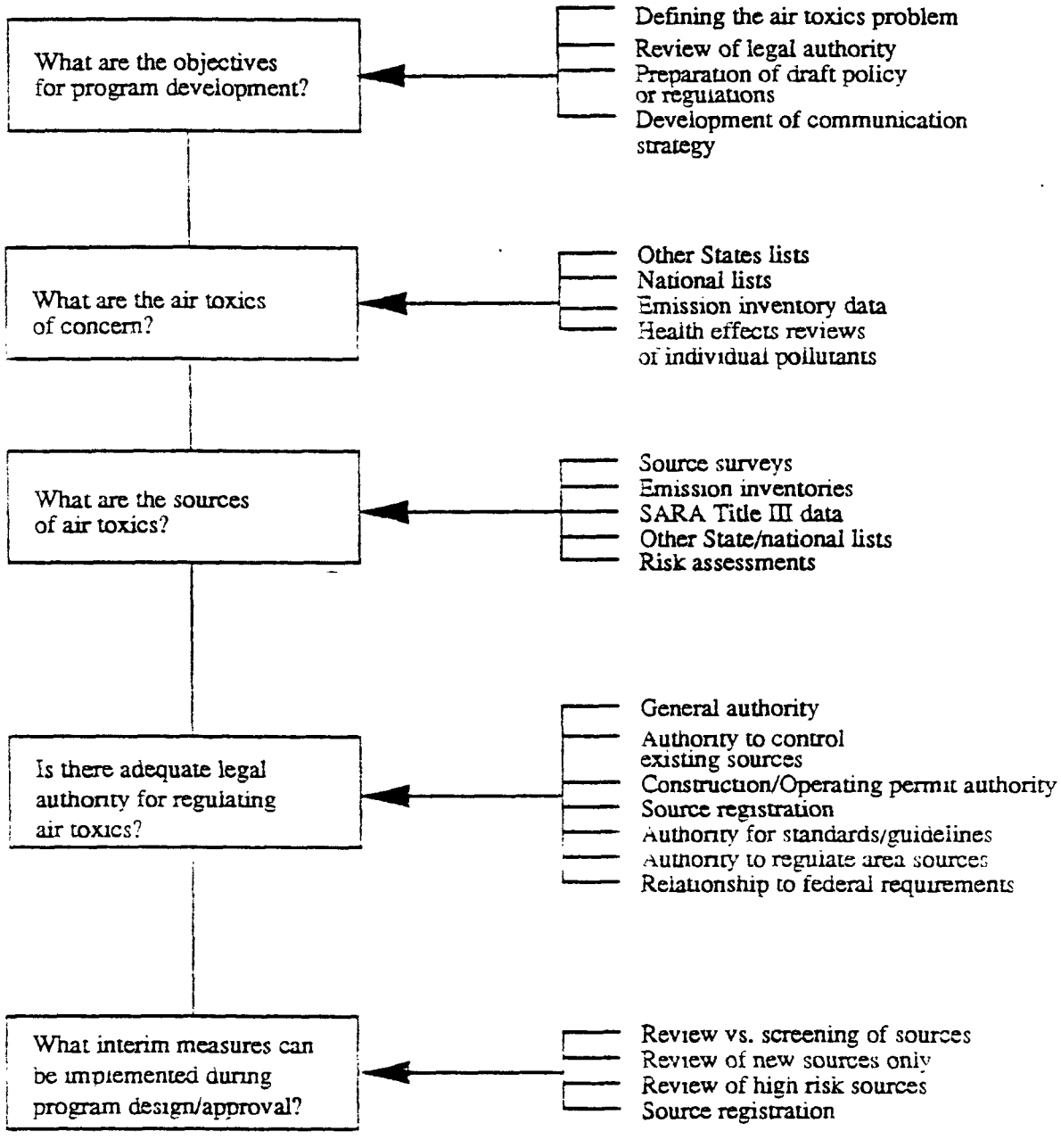


Figure 1-1. Steps in Problem Definition.

Once the S/L agency has defined the problem, the S/L is ready to design an air toxics control program. As illustrated by Figure 1-2, there are several key points to consider:

- o Development of short- and long-term program goals and milestones - The S/L decides what its air toxics program will accomplish and when. Many S/L agencies have already accomplished this via EPA's Multiyear Development Plan (MYDP) process.

- o Development of communications strategy - Communications objectives are defined, target audiences identified, communication techniques selected and messages refined during this step. For reasons discussed further in Sections 4.1 and 4.2, an effective communications strategy can be a key to successful program development.

- o Development of criteria for program evaluation - Beginning with the list of program goals, the S/L decides how to measure progress made toward each objective. Selecting measurable objectives, such as the number of sources reviewed and controlled annually, is essential for evaluating program progress and results.

- o Selection of control approach - The key points to consider here are: Will the agency base its program on promulgated rules or standards or will it opt for a policy or informal guidelines? What will be the basis of emission control (e.g., pollution prevention, control technology or ambient impacts)? (See Section 1.2 for further discussion of control approaches).

- o Definition of program scope - The S/L considers its program goals, and the information it has gathered, to determine which pollutants and sources should be addressed first. Program scope includes issues such as pollutant selection, source selection, and de minimis levels or exemptions. (See Section 2.1 and 2.2 for further discussion).

- o Assessment of resource requirements - This point is closely related to program scope and stringency. More extensive source coverage and review requires correspondingly greater staff resources. Phasing of implementation can help fit the program to available resources. A projection of necessary resources will likely be needed for budget requestpurposes.

- o Determination of program stringency - This includes establishing control technology and/or emission reduction requirements for each source or pollutant category. For the ambient impact element, methods for

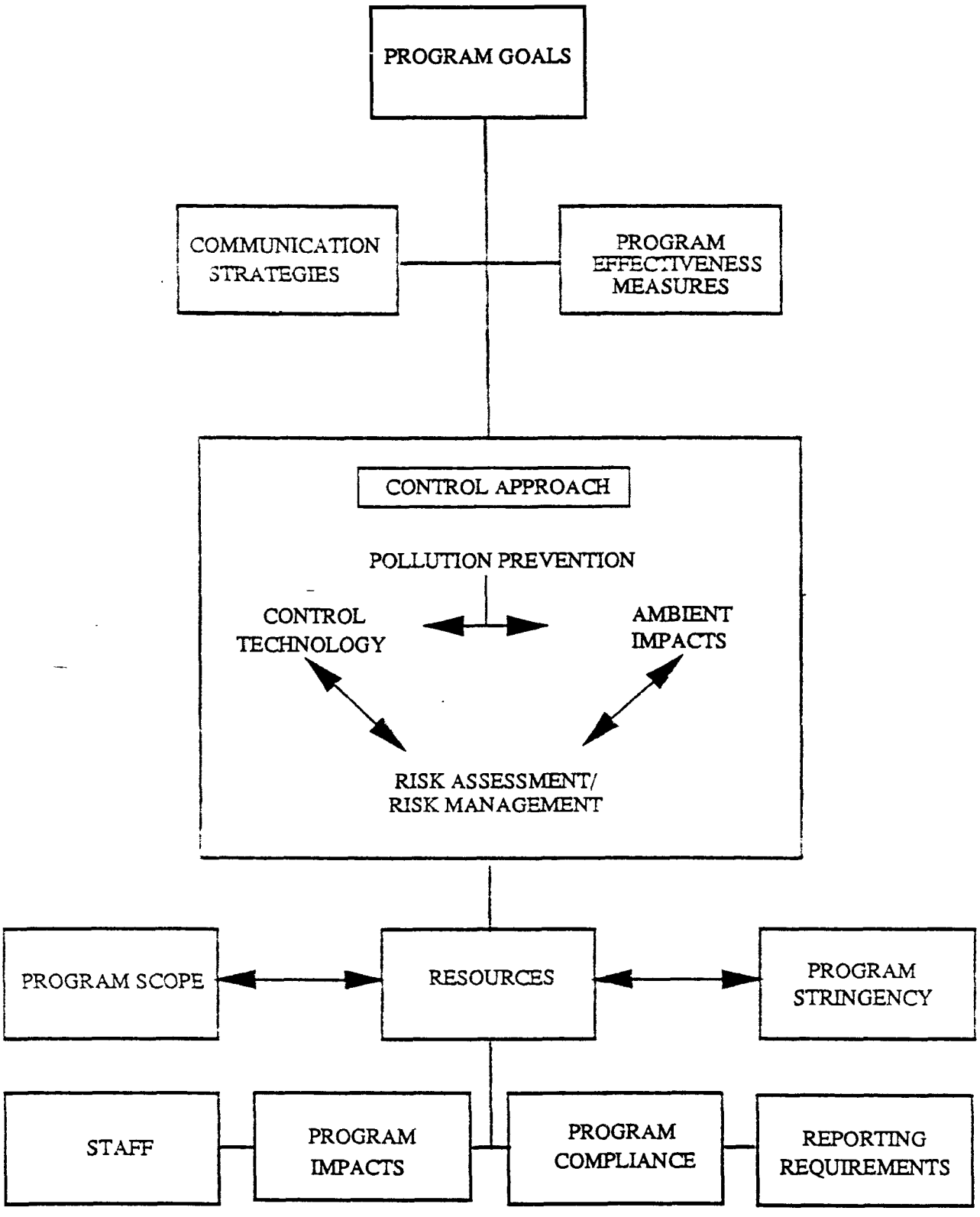


Figure 1-2. Designing an Air Toxics Program

developing ambient guidelines are needed for each pollutant or category of pollutants covered.

- o Definition of staff responsibilities - The agency must decide who will do what during program implementation and how many and what type of personnel will be required for the job.

- o Evaluation of program impacts - Agency procedures or policies may require evaluation of the cost, economic, and administrative impacts of the proposed program. This assessment may, in turn, influence program design or implementation decisions.

- o Determination of compliance schedules - The agency may decide during program design that, while it would be appropriate to have the air toxics control program broad in scope, it is not ready to tackle such a broad scope immediately. If this is the case, the agency should use a phased approach. Several agencies have adopted a phased approach with defined compliance schedules. For example, high risk point sources could be addressed first on a prioritized basis.

- o Definition of reporting requirements - Reporting is often accomplished through the existing permitting process because States have the authority to request information from sources through permit applications and source registrations.

1.1.3 Implementing, Enforcing and Evaluating the Program

At this point the S/L agency begins to put its control program into operation through:

- o Adoption of rules or policies - The agency's program is officially launched with the approval of appropriate rules, guidelines, policies, or procedures. Some S/L agencies have chosen to launch their initial program through New Source Review while others have initiated more comprehensive programs, including incorporation into the control program of existing sources for several pollutants and source types.

- o Resource acquisition - Resources include funding, equipment, and staff. For example, many S/L agencies have recruited staff with specialties such as toxicology and chemistry. Some States finance their programs through permit fees or other dedicated sources of revenue (e.g., vehicle tag fees).

- Initiation of source-specific review - Depending on the program design, this may mean starting permit application review and establishing permit conditions and compliance schedules. For programs covering existing sources, this may mean source registration and screening.

- Initiation of information collection activities - For example, an ambient monitoring network might be established to gather information on conditions near high risk sources or in certain urban areas. Or, a source survey (i.e., questionnaire) or review of SARA Title III data could be undertaken.

- Coordination with other programs - For efficiency and enhanced effectiveness, agencies coordinate with other programs such as ozone control measures, community right-to-know, particulate matter (PM_{10}) control, etc. Often strategies can be designed to utilize additional controls that simultaneously attain the goals and objectives of both air toxics and criteria pollutant programs.

1.2 APPROACHING AIR TOXICS CONTROL COMPREHENSIVELY

This subsection presents guidance on selection of an agency's basic air toxics control approach. This subsection will be useful to all S/L agencies, but especially those in the process of designing their program.

1.2.1 Converging Program Approaches

Although some programs emphasize one control approach more than another, the majority of S/L programs use a combined strategy made up of two basic program elements: control technology and ambient impact requirements. A 1989 survey of S/L programs by the State and Territorial Air Pollution Program Administrators and the Association of Local Air Pollution Control Officials (STAPPA/ALAPCO) showed that most agencies have adopted this more comprehensive approach to controlling air toxics. Figure 1-3 illustrates the comprehensive approach.

Two primary factors underlie this strategy. First, each individual approach has inherent limitations that can be offset by adoption of a combined approach. Second,

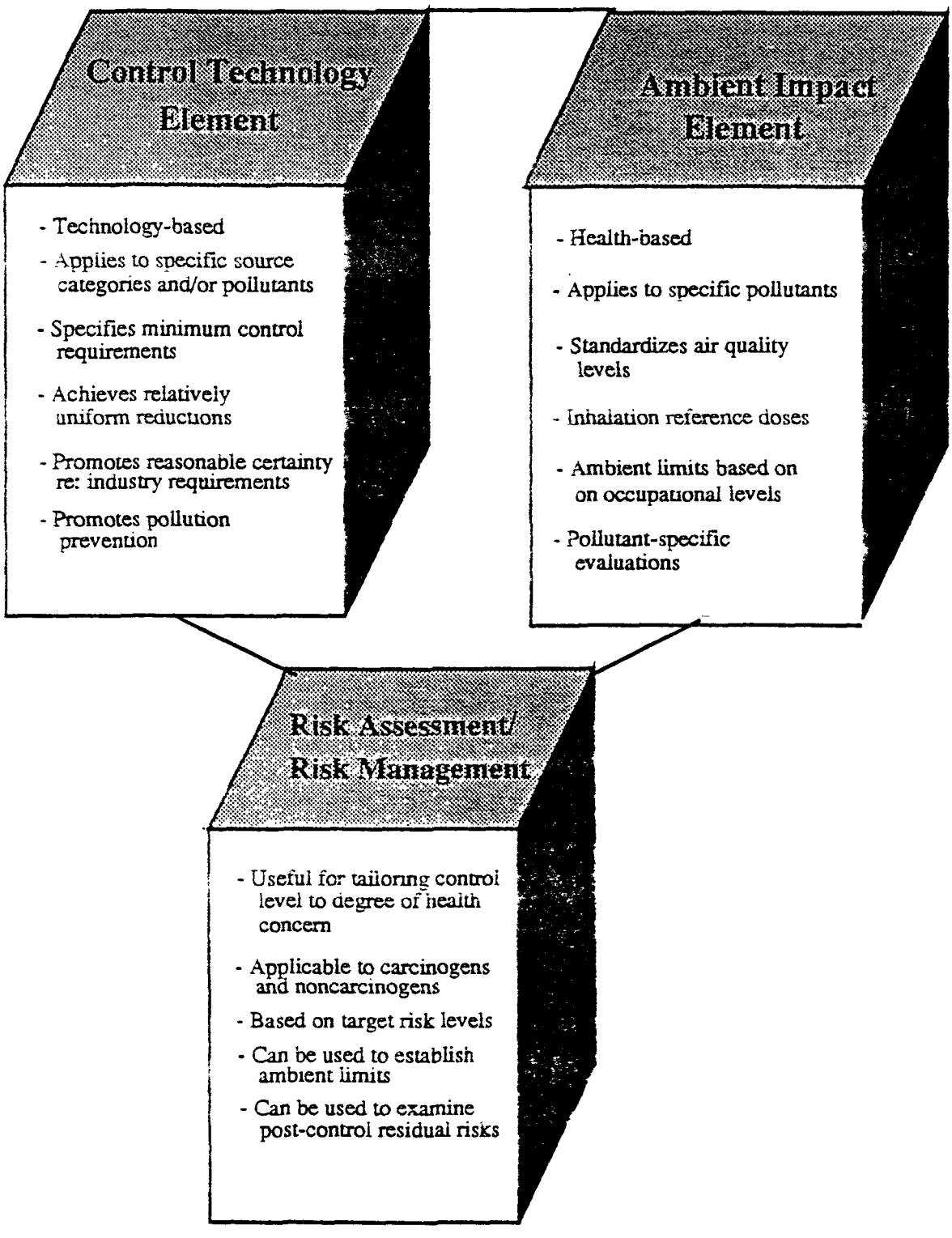


Figure 1-3. Comprehensive Approach to Controlling Air Toxics Emissions

because of the complexity of toxic air pollutants and emission sources, no one regulatory approach is likely to address fully the air toxics problem.

Under a comprehensive approach, individual program elements are combined into an integrated control strategy. The individual elements form a complementary set of requirements. In this way, the program can effectively address sources of air toxics that pose significant public health problems. For example, a program might include a Best Available Control Technology (BACT) requirement plus ambient impact requirements for new sources. In some cases, the optimum mix of controls is achieved based on pollution prevention, control technology and ambient air considerations. In others, a minimum level of control technology can be assured before addressing issues regarding the acceptability of the remaining residual risk.

An advantage of a comprehensive approach is that it combines the best features of the individual control elements. For example, the reasonable certainty of emissions reduction of a control technology approach is combined with the site-specific protection provided by an ambient impact approach. These advantages can be further enhanced by use of risk assessment/risk management techniques to evaluate individual sources.

A second advantage is that a comprehensive approach provides a framework within which to address new pollutants or sources as additional information or resources become available. Air toxics control is a long-term process. A first generation program, for example, may focus only on certain pollutants emitted by a limited number of sources. As a program evolves and matures, a second or third generation program may cover a much broader array of pollutants and sources, including area, nontraditional, and mobile sources. A comprehensive approach provides a framework for responding to these and other problems as they are identified.

1.2.2 Putting the Elements into a Comprehensive Framework

As mentioned above, a comprehensive approach combines individual program elements into an integrated control program. To accomplish this, several key

decisions are required. Figure 1-4 illustrates the key factors to consider for each step of a comprehensive approach.

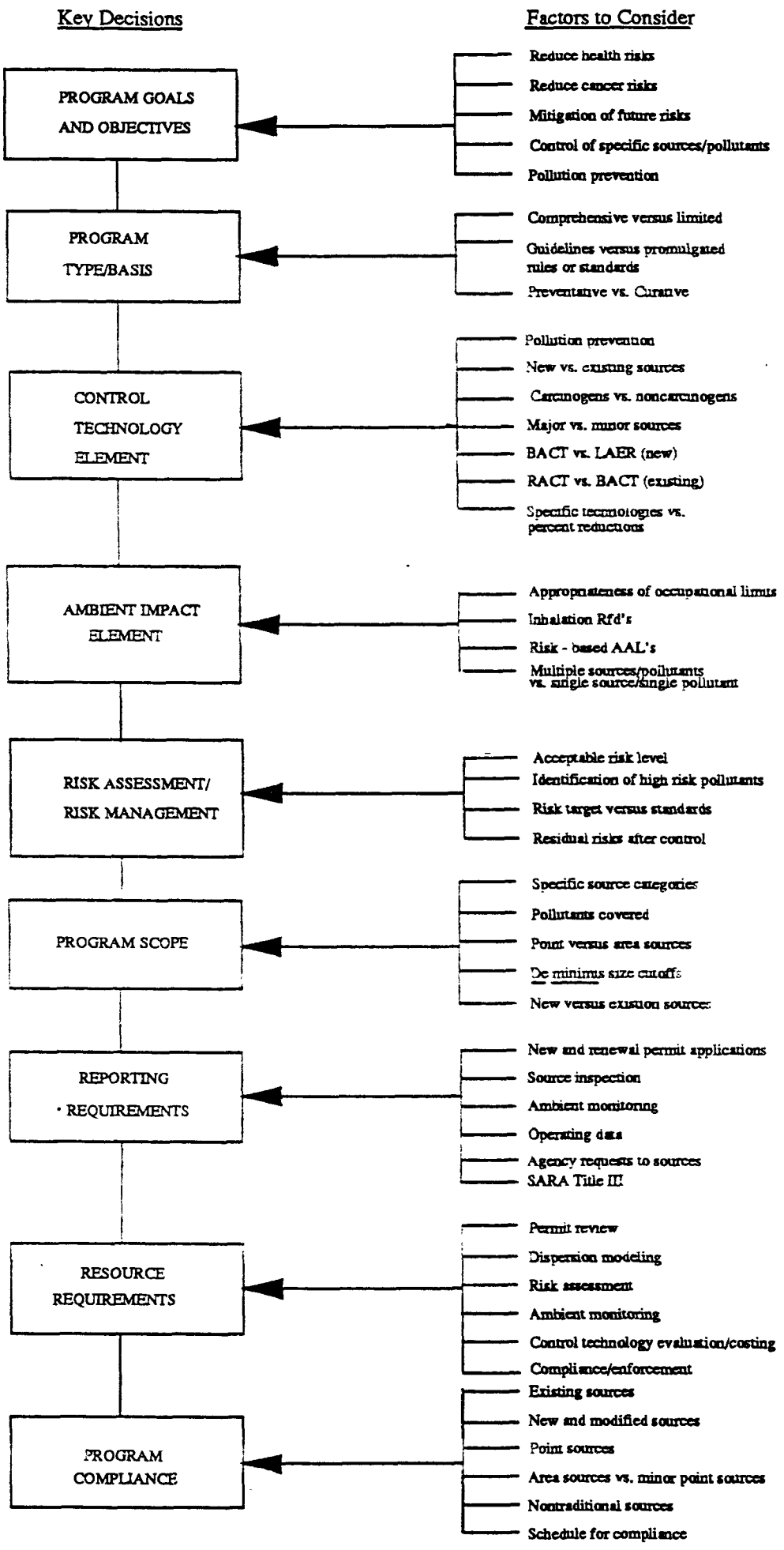
For any type of program, whether it emphasizes control technology or ambient impacts, one of the first major decision points is the selection of the basis for the control program. At this point, an agency is faced with the decision of how, or whether or not to combine control technology and ambient impacts requirements, whether to incorporate risk assessment/risk management into the program, and how to incorporate pollution prevention strategies into the program. It is important to remember that decisions about the basis of the control program are closely related to decisions about program scope, compliance schedules, and resources. The number and type of pollutants and sources covered affect an agency's ability to implement a particular type of program within available resources.

The following summarizes the different control approaches that, in combination, establish the basis of a comprehensive air toxics control program.

1.2.2.1 Pollution Prevention Initiatives

Pollution prevention initiatives are those which reduce pollution at the source, or which use environmentally sound recycling to prohibit releases of emissions, discharges, and waste. Pollution prevention is one of EPA Administrator Reilly's major environmental themes, signaling a change in policy from current EPA programs which stress treatment and disposal after pollution has been generated. In the future, EPA's emission regulations will be developed giving full consideration to prevention potential.

Probably the most significant prevention opportunities in air programs involve energy conservation and evaporation of volatile organic compounds (VOC). Examples include promoting the use of low solvent coatings, handling and storage of volatile fuels, and regulations that stimulate recycling of wastes to combustion units. The emission regulations EPA has set for over 40 source categories of VOC emphasize process modifications, reformulation, prevention measures, and recycling.


Key Decisions
Factors to Consider
PROGRAM GOALS AND OBJECTIVES
Reduce health risks
Reduce cancer risks
Mitigation of future risks
Control of specific sources/pollutants
Pollution prevention
PROGRAM TYPE/BASIS
Comprehensive versus limited
Guidelines versus promulgated rules or standards
Preventative vs. Curative
CONTROL TECHNOLOGY ELEMENT
Pollution prevention
New vs. existing sources
Carcinogens vs. noncarcinogens
Major vs. minor sources
BACT vs. LAER (new)
RACT vs. BACT (existing)
Specific technologies vs. percent reductions
AMBIENT IMPACT ELEMENT
Appropriateness of occupational limits
Inhalation Rfd's
Risk - based AAL's
Multiple sources/pollutants vs. single source/single pollutant
RISK ASSESSMENT/ RISK MANAGEMENT
Acceptable risk level
Identification of high risk pollutants
Risk target versus standards
Residual risks after control
PROGRAM SCOPE
Specific source categories
Pollutants covered
Point versus area sources
De minimus size cutoffs
New versus existing sources
REPORTING REQUIREMENTS
New and renewal permit applications
Source inspection
Ambient monitoring
Operating data
Agency requests to sources
SARA Title III
RESOURCE REQUIREMENTS
Permit review
Dispersion modeling
Risk assessment
Ambient monitoring
Control technology evaluation/costing
Compliance/enforcement
PROGRAM COMPLIANCE
Existing sources
New and modified sources
Point sources
Area sources vs. minor point sources
Nontraditional sources
Schedule for compliance

Pollution prevention is also an important facet of control in a comprehensive S/L air toxics program. In conjunction with considering "end-of-pipe" control technologies, process modifications, reformulation, prevention measures, and recycling can also be considered. As discussed below, some S/L agencies (e.g., Maryland, Nebraska, Kentucky) include pollution prevention in their definitions of BACT for toxics.

1.2.2.2 Control Technology Element

Under the control technology element, minimum control technology or emissions reduction requirements are established. These may be applied across-the-board or to specified source categories and/or pollutants. This element is summarized in Table 1-1.

Control technology requirements may be in the form of pollution prevention initiatives, specified technologies or control methods, a generic percent reduction requirement, an emission limit, specified operating practices, or a combination thereof.

The label given to the control technology requirement differs from State-to-State. For example, Maryland requires that most new sources use best available control technology for toxics, or "T-BACT". Wisconsin has a "Lowest Hazardous Emission Rate" (LHER) requirement for sources of known human carcinogens and "Best Commercially Available Control Technology" (BCACT) requirement for sources of suspected human carcinogens. New York and Texas require new sources to meet a BACT requirement. Irrespective of the name, the most important ingredients of a control technology requirement are its stringency and the sources to which it applies. Stringency and applicability requirements vary considerably among S/L programs, and may vary according to the toxicity of the pollutant. Many S/L programs with a control technology emphasis apply the most stringent level of control to new sources, and to the highest priority pollutants, such as carcinogens. Maryland, on the other hand, applies their top-down T-BACT requirement on a case-by-case basis to all new sources of toxics, taking into consideration the toxicity of the pollutants emitted and the cost of control, among

TABLE 1-1. SUMMARY OF CONTROL TECHNOLOGY ELEMENT

Main Features:	o	Categorical control technology or emission reduction requirements, or
	o	Case-by-case BACT requirement with or without a minimum emission reduction level
	o	Requirements typically apply independent of ambient impacts or risks
Advantages:	o	Ensures minimum degree of control
	o	Achieves equitable emission reductions within categories
	o	Provides less ambiguous requirements for affected facilities
	o	Encourages pollution prevention
	o	Is technology -forcing
Decision Points:	(1)	Rigor/stringency of control requirement (e.g.,definition of BACT)
	(2)	Relationship to other program elements (e.g., residual risk issues)
	(3)	Process for making control technology decisions(i.e., generic criteria or case-by-case)
	(4)	Applicability to new and/or existing sources
	(5)	Applicability to pollutant types (e.g., carcinogens)
Example Language:	Wisconsin * WI - NR 445.02 (4) (4) "Best available control technology" means an emission limit for a hazardous air contaminant based on the maximum degree of reduction practically achievable as specified by the department on an individual case-by-case basis taking into account, energy, economic and environmental impacts and other costs related to the source. Kentucky * KY - KAR 63:022 Section 2(4) (4) "Best available control technology" means emissions limitation based on the maximum degree	

of reduction for each pollutant listed in Appendix B to this regulation which would be emitted from any proposed affected facility which the cabinet, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs, determined to be achievable for such facility through application of production processes or available methods, systems, and techniques for control of such pollutant. In no event shall application of best available control technology result in the emission of an air pollutant which would exceed the emissions allowed by any applicable standard under Title 401, Chapters 57 and 59, or 40 CFR parts 60 and 61.

Maryland
* MD - COMAR 10.18.15.01 B(3)

(3) "Best available control technology for toxics" (T-BACT) means that production technology, emissions control technology, operation and maintenance procedures, other measures, or combinations of them that results in the maximum degree of emission reduction that the Department determines, on a case-by-case basis, is achievable by an installation, for each toxic air pollutant discharged, taking into account the potency and toxicity of each toxic air pollutant discharged as well as technical and economic feasibility.

Nebraska
* NE - Title 129, Ch. 1 013

013 "Best Available Control Technology" means an emission limitation or a design, equipment, work practice, operational standard or combination thereof, which results in the greatest degree of reduction of a pollutant, as basis, taking into account energy, public health, environmental and economic impacts and other costs.

other factors. As in many other States, Maryland applies its control technology requirement first, independent of the ambient impacts.

Development of a program including a control technology element involves at least three major decision points. These are illustrated in Figure 1-5. The three decision points are:

(1) the rigor or stringency of the control requirement,

(2) the relationship to other program elements, (i.e., ambient impacts and residual risk analyses) and

(3) the process for making control technology decisions (e.g., whether to establish generic requirements/guidelines or use a case-by-case approach).

1. Rigor/Stringency of Technology Requirement. The first decision point involves the rigor or stringency of the requirement. The level of stringency varies among agencies and, in fact, may vary from one source to another. The level of stringency does not vary so much in the formal definition of BACT. Indeed, most agencies seem to rely on a fairly standard definition where BACT determinations are made on a case-by-case basis and usually consider cost. Instead, the variation is in which sources and for what pollutants BACT is required. It is also likely that the stringency of the case-by-case BACT determinations varies between agencies, but that possibility has not been investigated.

Although formal definitions of BACT are fairly consistent, they may be used differently in practice. For example, the BACT guidelines developed by the Northeast States for Coordinated Air Use Management (NESCAUM), and Maryland's T-BACT approach use top-down BACT where a permit applicant must first identify the most stringent control possible (usually referred to as the lowest achievable emission rate or LAER), and then quantify emissions. At this step, no technically feasible alternative is ruled out. The starting assumption for the top-down BACT approach is that the most stringent control possible is BACT. The burden of proof for applying a less stringent control requirement rests with the applicant.

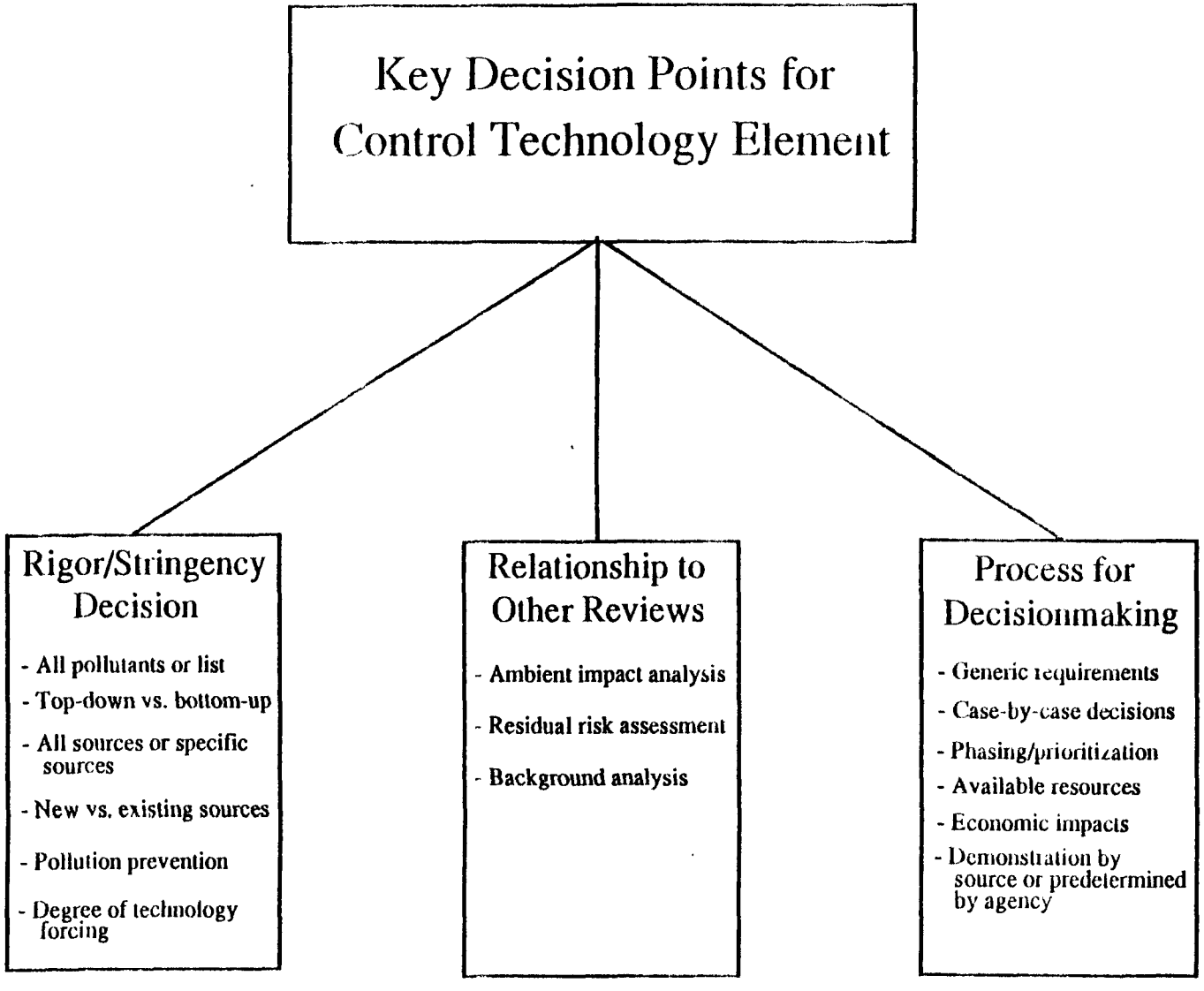


Figure 1-5. Key Decision Points for Control Technology Element

Other S/L agencies set a percent emission reduction as BACT. For example, New York has a BACT requirement for all sources of pollutants classified as highly toxic and generally considers BACT to result in 99 percent control. Similarly, New Jersey requires BACT for sources that emit any of the toxic volatile organic compounds that the State regulates and considers this to be 99 percent control. For toxic particulates, 99 percent control is expected from existing sources and 99.9 percent for new sources.

Related to the use of BACT are the requirements for reasonably available control technology (RACT) and the lowest achievable emission rate (LAER). A RACT requirement is typically less stringent than BACT, while LAER is more stringent.

Table 1-2 lists citations regarding control technology in several State air toxics regulations.

A brochure about EPA's Control Technology Center (CTC), which can provide information on control technology options and on how various S/L agencies have determined BACT and LAER for various sources, can be obtained by calling the CTC at (919)-541-0800.

2. Relationship to Other Program Elements. A second decision point involves determining the relationship between the control technology requirement and other reviews and requirements included in the program. Specifically, linkage to the ambient impacts element, both procedurally and conceptually, must be determined. Will sources be required to meet an AAL requirement in addition to the control technology requirement? Will sources be analyzed for their residual risks and become subject to additional controls or other changes before approval if they do meet the target risk level after meeting the control requirement? Most S/L agencies with a control technology component to their program couple it with an ambient impact component or use risk assessment techniques to evaluate the residual risks posed by a source after applying controls (e.g., New Jersey, Maryland, Texas).

TABLE 1-2. CITATIONS TO CONTROL TECHNOLOGY REQUIREMENTS

Control Requirements: Control Technology-Based

CT - Section 22a-174-29(d)
KY - 401 DAR 63:021 Section 3(2)
KY - 401 DAR 63:022 Section 3(2)
MD - COMAR 10.18.15.05 A,B,C
MD - COMAR 10.18.15.05 B
NE - Title 129, Ch.6 007
NV - 445.719
NV - 445.7195
NY - 6 NYCRR 212.2(c)
NY - 6 NYCRR 212.4(d)
NY - 6 NYCRR 212.9, Tables 1,2,3,4
OK - 3.8.4(c)(1)
OK - 3.8.4(d)
VA - 120-04-0303
VA - 120-05-0303
WI - NR 445.04(3)(a) and (3)(b)
WI - NR 445.04(4)
WI - NR 445.04(5)(c)
WI - NR 445.05(3)(a) and (3)(b)
WI - NR 445.05.(5)(e)

Definitions: Best Available Control Technology

KY - 401 KAR 63:022 Section 2(4)
MD - COMAR 10.18.15.01 B(3)
NE - Title 129, Ch.1 013
WI - NR 445.02 (4)

- Relationship Between BACT and Ambient Requirements. Several agencies require sources to apply BACT and then to meet acceptable ambient levels as well, while some either (1) allow sources to choose between a BACT requirement or an ambient level, or (2) require sources to apply BACT if the source cannot meet the agency's acceptable ambient level. In the first case, where BACT does not achieve ambient impact objectives, options that are technology-forcing, include pollution prevention or limiting operation are also considered.

- BACT Requirement for New Versus Existing Sources. A BACT requirement for a source not yet constructed is much different from an economic standpoint than a BACT requirement for an existing source that has applied for a renewal of an operating permit. Accordingly, few agencies apply rigorous top-down BACT requirements to existing sources, and those that do generally combine the technology requirements with acceptable ambient levels and/or risk assessment requirement.

- BACT Requirements for Different Toxicity Classes. Another issue relating to the stringency of BACT requirements is the pollutants that trigger application of BACT. Several agencies require BACT, or even the more stringent LAER only for emissions of carcinogens. Some agencies require BACT on all new sources, but only on sources of carcinogens for existing sources.

- Emissions Sources. At least one State (Wisconsin) makes a distinction between which emission units within a facility must install BACT or meet LAER. In this case, the emission units at the facility that emit the greatest amount of the pollutant must install BACT (or meet LAER in the case of known human carcinogens). If the pound per hour emission rate given in the regulation is not met for the facility, then additional units must install BACT (or meet LAER) until the emission rate is met.

- Residual Risks. The issue concerning residual risk is "What additional source requirements should apply if an unacceptable residual risk remains after applying BACT or other applicable controls?" In this case, the agency must carefully weigh post-BACT options. A likely concern in such cases will be the potential economic consequences of various post-BACT options. As a result, S/L agencies will need to evaluate the cost-benefit of reducing risks to target levels. In the face of severe economic consequences, a compliance schedule may need to be adopted that would achieve risk targets within a specified period of time in lieu of imposing unacceptably high costs or economic consequences (i.e., plant shutdown) in order to achieve immediate compliance.

3. Process for Making Control Technology Decisions. A third decision point involves how control technology decisions are made. The question is whether such a requirement should apply to individual source categories or pollutants, or whether a case-by-case approach should be used. A categorical approach may require somewhat more time initially. However, once established, control technology requirements or guidelines can facilitate the review of individual source applications. On the other hand, a case-by-case approach provides greater flexibility to handle unique situations. However, it may involve more engineering evaluation during the review of permit applications.

1.2.2.3 Ambient Impact Element

Under the ambient impact element, health-based ambient concentration limits are used to establish control requirements for individual sources. This element is summarized in Table 1-3.

The main feature of the ambient impact element is that it relies on ambient concentration values as a control mechanism and therefore, control is based on possible health effects rather than control technology. The objective in setting an acceptable ambient level (AAL) is that it will be stringent enough to protect the public from exposure to concentrations that would result in unacceptable health effects. Under this approach, AALs have been established as either screening levels, standards, or guidelines. This approach is premised on the assumption that "acceptable" levels of exposure can be defined for individual toxic compounds in the ambient air.

There are two major decision points in the design of a program that includes an ambient impact element. The decision points are illustrated in Figure 1-6. They are related to:

(1) The use of occupational levels
   (a) which uncertainty factors to apply, and
   (b) which averaging times to use.

TABLE 1-3. SUMMARY OF AMBIENT IMPACT ELEMENT

Main Features:	o	Health-based acceptable ambient levels (AALs) are used as basis for control requirement
	o	Occupational levels, inhalation reference doses, or risk-based AALs commonly used
	o	AALs may be ambient standards or screening guidelines
Advantages:	o	Source controls based on health considerations
	o	Considers characteristics/toxicity of individual pollutants
	o	Considers ambient impacts of individual sources
	o	Can use toxicological research done by others
Decision Points:	(1)	Whether to use occupational levels or chemical-specific values
	(2)	What uncertainty factors to apply
	(3)	What averaging times to use

Example Language:

Connecticut
* CT - Section 22a-174-1

"Maximum allowable stack concentration" or "MASC" is the maximum allowable concentration of a "hazardous air pollutant" in the exhaust gas stream of a "source" at the "discharge point." (MASC is based on a "Hazard Limiting Value" which is derived from an uncertainty factor applied to an occupational standard.)

Kentucky
*KY - 401 KAR 63:021 Section 2(3)

(3) "Threshold ambient limit (TAL)" means the concentration level in the ambient air of a toxic air pollutant, calculated pursuant to Appendix B to this regulation. (Appendix B lists 736 pollutants, and gives the averaging time and a value for each. The Threshold Ambient Level is calculated by dividing the given value by the hours of emission of the substance per week from the source.)

TABLE 1-3. SUMMARY OF AMBIENT IMPACT ELEMENT (Continued)

Maryland
* MD - COMAR 26.11.15.01 B(1)

(1) "Acceptable ambient level" (AAL) means a concentration of a toxic air pollutant in the atmosphere that the Department determines will provide a margin of safety to protect the public health from toxic, noncarcinogenic effects that may be caused by the toxic air pollutant and that is used to evaluate the air quality impacts of all premises within a 5 kilometer (3.1 mile) radius. AALs are listed in Regulation .13, below.

Oklahoma
* OK - 3.8.2 (2)

(2) Maximum Acceptable Ambient Concentration (MAAC) means the maximum allowable twenty-four hour average concentration, in ambient air, of a toxic air contaminant.

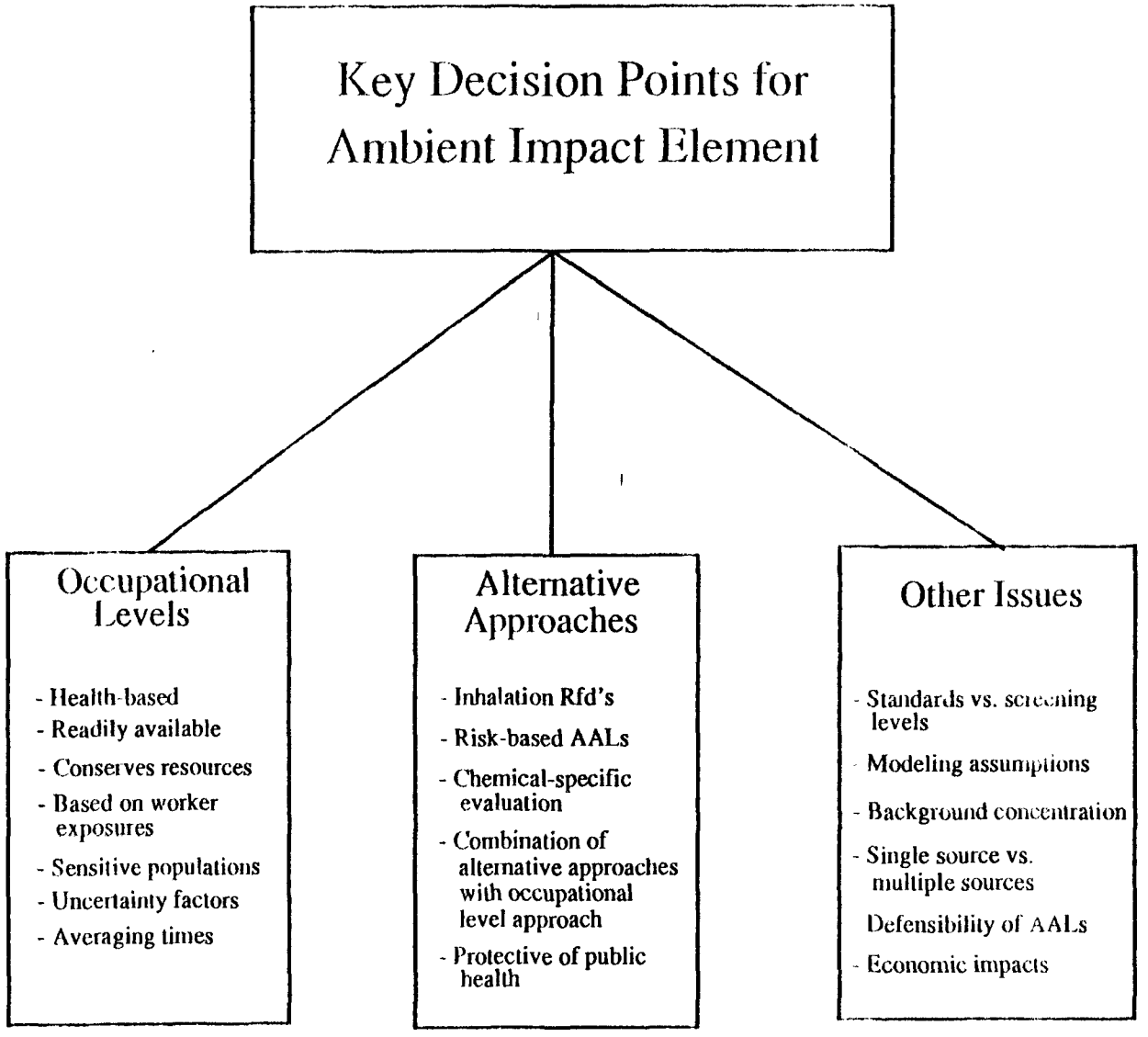


Figure 1-6. Key Decision Points for Ambient Impact Element

(2) Alternative approaches

(a) inhalation reference doses concentrations (Rfcs),

(b) risk-based ambient levels, and/or

(c) chemical-specific evaluation.

1. Occupational Levels. The first decision point is whether or not to use occupational levels as a basis for ambient limits. Acceptable ambient levels have been established by some S/L agencies by applying an uncertainty factor to an occupational standard for a particular pollutant. This approach has typically been chosen because of two main advantages. First, for many pollutants, occupational standards are the only health-based standards that are readily available. Secondly, resource limitations have not allowed chemical-specific studies to be undertaken.

On the other hand, there are several disadvantages to using occupational levels to set ambient limits. For example, Threshold Limit Values (TLVs) are occupational levels established by ACGIH. They are based on a variety of health effects including cancer and acute and chronic noncancer effects. However, the TLV is set to protect a healthy worker population, and as such is based on an 8 hour/day, 40 hour/week exposure (which allows for recovery between exposures). The TLV does not take into account exposures that may be of a prolonged duration (such as ambient exposure), or consider sensitive populations, such as children or the elderly. The application of an uncertainty factor to the TLV is intended to lower the TLV to a level where prolonged exposure and sensitive populations are considered.

Exposure time-adjustment factors are typically applied to convert an occupational level from an 8-hour exposure to a 24-hour exposure. A second uncertainty factor is also applied to account for the sensitivity of the general population as compared to the healthy worker assumption used for the occupational limit, and to account for uncertainties in the scientific basis of the standards/guidelines. Different uncertainty factors may also be applied to different groups of chemicals in recognition of their relative toxicity. For example, one factor might be used for known human carcinogens, another for probable human

carcinogens, a separate factor for chronic systemic toxicants, and another for acute irritants.

Averaging times, or the length of time over which a source is allowed to average its contribution to the ambient concentration, also have a significant impact on the stringency of the AAL. For example, an ambient level of 10 ug/m^3 with an averaging time of 8 hours is more stringent than an ambient level of 10 ug/m^3 with an annual averaging period.

Many agencies choose averaging periods based on the health effects of particular pollutants and, consequently, use more than one averaging period in their program. For example, an annual averaging period is frequently used for carcinogens and other pollutants with effects associated with long-term, chronic exposure, while a 1-hour averaging time is often used for pollutants associated with health effects occurring from short-term, acute exposures. Averaging periods reported in the STAPPA/ALAPCO survey ranged from 3 minutes to annual. The most commonly used averaging times are annual, 24 hours, 8 hours, and 1 hour.

The relationship between AALs and averaging times is important to the overall stringency of the control requirement. An averaging time says, in effect, that excursions above the AAL are permissible provided that they are compensated for by equivalent excursions below the AAL over the period of the averaging time. In determining the stringency of the AALs and their associated averaging times, an agency has to address whether an AAL may be exceeded for some period of time. In the case of some very acutely toxic pollutants, a short averaging time (e.g., 15 minutes) is necessary to ensure that short-term releases do not go uncontrolled.

One question frequently asked is how to compare ambient levels that have the same uncertainty factor, but different averaging times. To perform this comparison, certain emission characteristics and dispersion assumptions must be made. In a study done by the Commonwealth of Virginia, various safety factors were converted to an equivalent basis for direct comparison of safety factors and averaging times. The results of this analysis are summarized in Table 1-4. As shown in the table, the uncertainty factor and averaging time both affect the stringency of the AAL. For example, a TLV/100 level averaged over an 8-hour period is more stringent than a TLV/300 level averaged on an annual basis.

TABLE 1-4. EQUIVALENT UNCERTAINTY FACTOR FOR 24-HOUR AVERAGING TIME

AVERAGING TIME	UNCERTAINTY APPLIED TO TLV	EQUIVALENT UNCERTANITY FACTOR FOR 24-HOUR AVERAGING TIME [a]
8 hour	10	20
24 hour	10	10
1 hour	40	200
24 hour	40	40
24 hour	30	30
24 hour	42	42
annual	42	10
8 hour	50	100
24 hour	50	50
annual	50	10
24 hour	60	60
30 minutes	100	1000
8 hour	100	200
24 hour	100	100
8 hour	200	400
24 hour	200	200
1 hour	300	1500
24 hour	300	300
annual	300	60
24 hour	420	420
annual	420	84
24 hour	1000	1000
annual	1000	200

[a] Based on calculations by the Commonwealth of Virginia, under typical conditions and non-varying emission rates:

The highest 1-hour concentration of a pollutant = 25 X ANNUAL MEAN
5 X 24-HR MEAN
2.5 X 8-HR MEAN

For example, if the annual mean concentration is 10, the 24-hour mean would be 50, the 8-hour concentration would be 100, and the highest 1-hour concentration would be 250.

2. Alternative Approaches. There are alternatives to using the occupational level/uncertainty factor approach. These include using EPA's reference concentrations (RfCs), developing risk-based AALs for carcinogens using EPA's unit risk factors, or evaluating health effects on a chemical-specific basis and basing the AAL on that evaluation.

RfCs, developed by EPA, are based on a review of health effects data and represent an annual average concentration below which a long-term exposure is unlikely to result in adverse health effects. Consequently, they are an alternative to using occupational standards as screening levels for ambient impacts. As of June 30, 1990, RfCs have been developed and verified for 19 chemicals. Many more (primarily for chemicals listed in Clean Air Act amendment legislation) are currently under review by EPA's Reference Concentration Verification Work Group. The pollutants for which RfCs have been developed are listed in Table 1-5.

For more information on inhalation RfCs, call the Air Risk Information Support Center (Air RISC) hotline at (919) 541-0888.

A number of S/L agencies (e.g., Connecticut, Rhode Island) have developed AALs for carcinogens using unit risk factors developed by EPA's Human Health Assessment Group (formerly the Carcinogen Assessment Group). To convert a unit risk factor to an AAL, the agency first needs to determine a target risk level that will be the basis of evaluation. The most commonly used measure of acceptable risk is the maximum individual risk (MIR) of the most exposed individual (MEI). Risk to the MEI means the risk of contracting cancer associated with the highest ambient concentration to which anyone would be continuously exposed over a 70-year lifetime. According to the 1989 STAPPA/ALAPCO survey of S/L agencies, most agencies that use risk assessment have an acceptable risk level of either one in one million (1×10^{-6}), or one in one hundred thousand (1×10^{-5}). An example calculation showing how to convert a unit risk factor into an AAL is shown in Table 1-6. Pollutants for which inhalation unit risk factors have been developed are listed in Table 1-7.

TABLE 1-5. LIST OF POLLUTANTS FOR WHICH INHALATION REFERENCE CONCENTRATIONS (RfCs) HAVE BEEN DEVELOPED (AS OF JUNE 30, 1990)

CHEMICALS WITH VERIFIED RfCs

Acetaldehyde
Acrolein
Bromomethane
Carbon disulfide
Cumene
1,4-Dichlorobenzene
Dichloromethane (methylene chloride)
Dimethylamine
Epichlorohydrin
Hydrogen chloride
Hydrogen sulfide
Hexane
Mercury (inorganic)
Nitrobenzene
Propylene glycol monoethyl ether
Tetrahydrofuran
Toluene
Xylene

TABLE 1-6. EXAMPLE CALCULATION OF AAL FROM UNIT RISK FACTOR

1. URF = (4.8×10^{-3}) = the probability of dying of cancer following 70-years of continuous exposure to 1 ug/m^3 of a particular chemical in the ambient air.

2. State's ARL = 1×10^{-5}

3. URF x AAL = ARL

4. $AAL = \frac{ARL}{URF}$

5. $AAL = \frac{1 \times 10^{-5}}{4.8 \times 10^{-3}}$

6. AAL = 0.00208 ug/m^3

Where: URF = unit risk factor
ARL = acceptable risk level
AAL = acceptable ambient level

TABLE 1-7. POLLUTANTS WITH EPA INHALATION UNIT RISK FACTORS

Acetaldehyde	Acrylonitrile
Arsenic	Asbestos
Benzene	Benzo(a)pyrene
Beryllium	1,3-butadiene
Cadmium	Carbon Tetrachloride
Chloroform	Chromium (VI)
Coke oven emissions	1,2-Dichloroethane
1,1-Dichloroethylene	Epichlorohydrin
Ethylene dibromide	Ethylene oxide
Formaldehyde	Gasoline (marketing)
Hexachlorobenzene	Methylene chloride
Nickel	Propylene oxide
- Refinery dust	Styrene
- Subsulfide	2,3,7,8-TCDD
Tetrachloroethlyene	Trichloroethylene
Vinyl chloride	

For more information on unit risk factors, call the Air RISC hotline at (919) 541-0888.

Evaluating health effects on a chemical-specific basis and deriving AALs from the evaluation is a resource-intensive effort. The advantage of this type of study is that the AALs that are derived are health-based numbers that can consider cancer and noncancer effects and are protective of public health (including sensitive populations). The Massachusetts Department of Environmental Quality Engineering has completed such a study (a 5-year effort) and compiled a document entitled The Chemical Health Effects Assessment Methodology and the Method to Derive Acceptable Ambient Limits (CHEM and AAL). The document describes the methodology used to review the scientific data for four categories of health effects for each chemical. The health effects review results in a "hazard score" being assigned to each chemical for each of the four health endpoints. The hazard scores are used to adjust the occupational level downward to account for factors that include chronic exposure, sensitive populations, and noncancer effects. Because the hazard scores are different for each chemical, the occupational levels are "customized" to form the basis for the AAL.

As of this writing, Massachusetts has assigned AALs to approximately 105 chemicals and expects their chemical-by-chemical evaluation to be an ongoing process.

Another issue related to the stringency of any ambient-based control requirement is whether the source must take into account background concentrations of the pollutant in question, or if the source must simply be concerned with its own contribution to the ambient concentration. From the standpoint of public health protection, background concentrations are very important. From a source's point of view, however, if background concentrations are taken into account, the source is forced to use tighter control measures when the level of the pollutant in the ambient air may not be attributable entirely to the source. Probably because of the difficulty involved in measuring background levels, very few agencies consider background concentrations in evaluating whether or not acceptable ambient levels are being met.

Because of the impact that the consideration of background concentrations can have on control decisions, this may be a factor to include in a "later generation" of a control program.

Table 1-8 provides citations to S/L regulation containing ambient impact requirements.

1.2.2.3 Risk Assessment/Risk Management

1. Overview. Risk assessment is the process of determining the potential adverse health effects of human exposure to environmental hazards. Risk assessment includes four steps:

(1) Hazard identification. A qualitative risk assessment, hazard identification attempts to answer the question: Does exposure to a specified hazard cause adverse health effects (such as cancer) in humans? A qualitative determination of risk may entail some interpretation, such as whether animal carcinogens are presumed to be human carcinogens, or whether benign tumors in animals represent potential human carcinogenicity.

(2) Dose-response assessment. This is the process of characterizing the relationship between the dose of a toxicant received, and the incidence of adverse health effects in exposed populations. This step usually requires extrapolation of data from animal studies to humans and from high doses to low doses.

(3) Exposure assessment. This is the process of measuring or estimating the intensity, duration, and frequency of human exposure to a toxicant.

(4) Risk characterization. This is the final step of risk assessment and is the quantitative process of estimating the magnitude of the public health problem that results from the hazard. It involves the combination of the hazard identification, dose-response assessment, and the exposure assessment. Thus, the final expressions of health risks are derived in this step.

Risk management is the decision-making process in which an action is taken or a policy developed once a risk has been determined to exist. It integrates the risk assessment with technical, political, social, and economic issues. Risk management is also a means of setting priorities among possible actions for a toxicant or source. Risk management must take into account the uncertainties associated with various assumptions and judgments made in each step of the risk assessment process.

TABLE 1-8. CITATIONS TO AMBIENT IMPACT REQUIREMENTS

Control Requirements, Ambient Concentrations-Based

CT - Section 22a-174-29(b)(3) and (b)(4)
KY - 401 KAR 63:021 Section 3 and Appendix B
KY - 401 KAR 63:022 Section 3 and Appendix B
MD - COMAR 10.18.15.06
MD - COMAR 10.18.15.07 B(2)
MD - COMAR 10.18.15.07 C(2)
NV - 445:7195
NV - 445:720
OK - 3.8.4(b),(c),(d),(e)
RI - 22.5.4
VA - 120-04-0304
VA - 120-05-0304
WI - NR 445.04
WI - NR 445.05 (1)(a),(b);(2)(a),(b)
WI - NR 445.05 (4)(a),(b)

Control Requirements: Ambient Concentrations -- Setting Acceptable Concentrations

CT - Section 22a-174-29(a)(2) and (a)(3)
CT - Section 22a-174-29(c)
KY - 401 KAR 63:021 Appendix A
KY - 401 KAR 63:022 Appendix A
MD - COMAR 10.18.15.08 A
MD - COMAR 10.18.15.09 D(1),(2)
NV - 445.718
NV - 445.7185
OK - 3.8.4(f)
VA - 120-04-0304
VA - 120-05-0304
WI - 445.04 (1)(a) and (1)(b)
WI - 445.04 (2)(a) and (2)(b)
WI - 445.05 (1)(a) and (1)(b)
WI - 445.05 (2)(a) and (2)(b)
WI - 445.05 (4)(a) and (4)(b)

There are no fundamental differences between cancer and noncancer risk assessment/risk management issues. The major difference between the two is that unit risk factors are available for carcinogens, thus giving the S/L agency a method to derive a single number at the acceptable risk level. This makes cancer effects easier to deal with compared to noncancer effects. The development of inhalation Rfcs (discussed in Section 1.2.2.2), will make noncancer risk assessment much more accessible to S/L agencies.

The main advantage of using risk assessment/risk management is that the end result is an indication of relative health risks and a uniform threshold of protection for the public. Risk assessment/risk management also allows the S/L agency to take into account variations in the economics associated with individual sources in setting control requirements.

The main disadvantage of using risk assessment/risk management is the difficulty in determining an "acceptable" risk level. This difficulty is due to the uncertainties associated with the many assumptions that must be made regarding population exposure, dose-response, hazard identification, etc. The toxicological resources required to evaluate individual facilities is another drawback. As described in Section 1.2.2.2, according to the 1989 STAPPA/ALAPCO survey of S/L agencies, most agencies that use risk assessment/risk management have an acceptable risk level of either one in one million (1×10^{-6}), or one in one hundred thousand (1×10^{-5}).

A decision closely associated with the determination of the target or acceptable risk level is whether the risk level should be a screening tool or a regulatory requirement. Several S/L agencies use risk targets as a screening value for triggering a more detailed evaluation of a source. Others use risk levels as an "action" level. If the risk level is used as an "action" level (i.e., plant shutdowns are possible), an appeal process will probably be necessary to allow the source the chance to, for example, provide better modeling data or initiate actions to resolve the problem.

An issue here is whether the burden to undertake risk assessments should be placed primarily on industry or whether the agency will conduct source-specific risk assessments. The State of Maryland requires the source to perform the risk assessment, an approach that Maryland feels saves the agency significant resources.

Risk assessment/risk management comes into play with both control technology requirements and ambient impact requirements. For example, residual risk after the application of controls is an issue addressed by risk assessment/risk management, as is the use of inhalation Rfcs or unit risk factors as a basis for setting AALs.

2. Risk Assessment/Risk Management Guidance. Risk assessment guidelines relating to environmental carcinogens, mutagens, developmental toxicants, chemical mixtures and estimating exposure were issued by EPA on September 24, 1986 (51 FR 33992). The guidelines were developed to promote high technical quality and Agency-wide consistency in the risk assessment process.

The guidelines were developed partly in response to a 1983 National Academy of Sciences publication entitled "Risk Assessment in the Federal Government: Managing the Process," which recommended that Federal regulatory agencies establish risk assessment guidelines. An EPA task force, convened by then EPA Administrator William D. Ruckelshaus to study ways to improve the scientific foundation for Agency regulatory decisions, accepted the recommendation, and work on the guidelines began early in 1984. As announced on August 26, 1988, some of the guidelines are currently being revised (53 FR 32656). Additional guidelines are also under development for various topics, including noncancer effects, reproductive toxicity, and exposure-related measurements.

A second source of information is the NATICH report Qualitative and Quantitative Carcinogenic Risk Assessment (EPA 450/5-87-003), which describes EPA's risk assessment procedures for carcinogens. The Air Risk Information Support Center (Air RISC) is also developing a guidance document on risk assessment that will include noncancer risk assessment.

Another important source of assistance for risk assessment/risk management is EPA's Integrated Risk Information System (IRIS). IRIS provides information on how chemicals affect human health and is a primary source of risk assessment information on chemicals of environmental concern. IRIS makes chemical-specific risk information readily available to those who must perform risk assessments and also increases consistency in risk management decisions. The health assessment information contained in IRIS has been reviewed and agreed upon by two interdisciplinary review

groups of EPA scientists who have extensive experience in risk assessment. This Agency-wide agreement on risk information is one of the most valuable aspects of IRIS.

The IRIS is an online database that may be accessed via EPA's electronic mail (E-mail) system (available through DIALCOM, Inc.). The information in IRIS is divided into two major components: (1) chemical-specific toxicity and regulatory information, and (2) documentation providing instruction and explanation in support of the system and the chemical files.

Each chemical file contains:

- verified reference doses based on noncancer health effects data associated with chronic exposures,
- verified risk estimates for carcinogenicity,
- drinking water health advisories,
- summaries of selected EPA regulations, and
- supplementary data (e.g., acute toxicity information and physical-chemical properties)

The database can be searched by chemical name or Chemical Abstracts Service (CAS) number. Over 260 chemicals are represented.

For more information on IRIS, call IRIS User Support at (513) 569-7254 (EPA Cincinnati).

A fourth source of assistance is EPA's Air RISC. One of Air RISC's goals is to serve as a focal point for disseminating information on health, exposure, and risk assessments for toxic pollutants.

For a brochure describing Air RISC activities call the Air RISC hotline at (919) 541-0888.

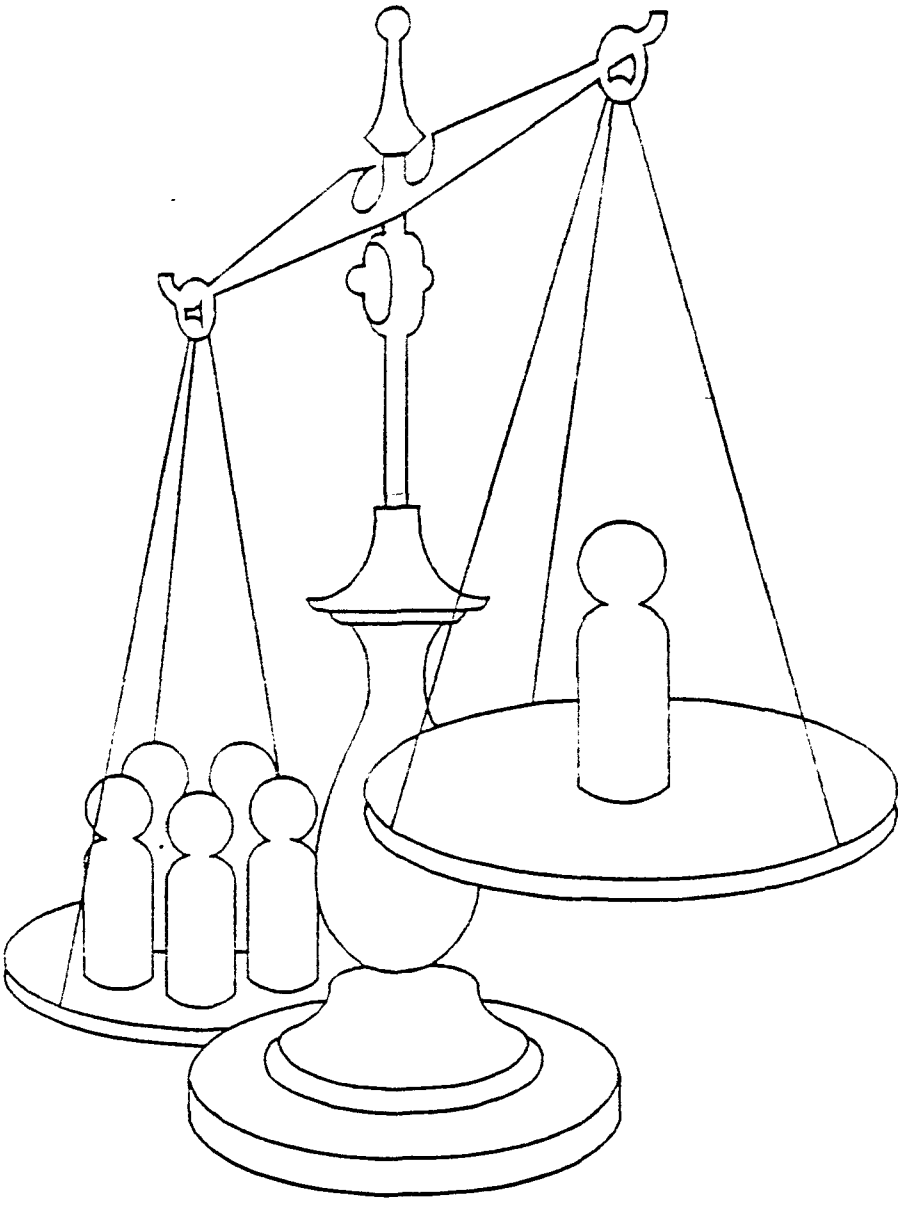
A more complete list of primary sources of EPA information on risk assessment is provided in Table 1-9.

TABLE 1-9. PRIMARY EPA SOURCES OF RISK ASSESSMENT INFORMATION

Source	Clients	Format	Costs	Information Available	Contact
Air RISC (Air Risk Information Support Center)	State & Local air agencies; EPA regional personnel		none	Information and technical guidance relative to health, exposure and risk assessment of air toxics	(919)541-0888 or (FTS)629-0888
CTC (Control Technology Center)	State & Local air agencies; EPA regional personnel		none	Engineering guidance and support on air emissions characterization and pollution control technology	(919)541-0800 or (FTS)629-0800
IRIS (Integrated Risk Information System)	EPA staff; and the interested public		$25/hour (1 hr/mo minimum + $0.05 /screen	Agency consensus summaries of information on hazard and dose-response assessment; reference citations; and EPA contacts for further information	User Support (513)569-7254 or (FTS)684-7254
NATICH (National Air Toxics Information Clearinghouse)	Federal, State, & Local air agencies		~ $12/HR for S/L and EPA	Air pollution control agency data (eg program descriptions, permit data, monitoring data, etc); TRIS data EPA risk assessment data	Call your Regional Air Toxics contact, ADP coordinator, or Clearinghouse staff (919)541-0850

SECTION 2.0

MAKING CRITICAL DESIGN CHOICES



2.0 MAKING CRITICAL DESIGN CHOICES

Highlights of This Section

- Defining the scope of an air toxics program is a critical step in program development which is closely related to program stringency and other design and implementation issues.
- Program scope includes pollutant selection, source category selection, existing source coverage, size and emission cutoffs, program phasing, and resource allocation issues.
- A variety of resources are available to assist S/L agencies with program scope decisions.

Defining the scope of a program is a critical step in the program development process. Program scope decisions are critical for several reasons, including the following:

- Program scope decisions affect the ability of an agency to address air toxics goals. For a program to be successful, the number of pollutants and sources selected for regulation should be realistic and in keeping with the program's goals. Defining program scope too narrowly, however, may result in less public health protection than desired.
- Program scope decisions influence whether program goals can be achieved within available resources. An overly expansive program, for example, may subject more sources to regulation than an agency can handle within available resources. If staff and other resources are overloaded, the chance of achieving the program's goals is likely to diminish.
- Program scope decisions determine the size and nature of the regulated community. Program scope decisions can greatly influence the politics of program approval by defining the nature and extent of the potential opposition to a program.

There are at least six main topics to consider in defining the scope of an air toxics program. They are:

(1) selection of pollutants,

(2) selection of source categories,

(3) regulation of existing sources,

(4) selection of size and emission cutoffs/exemptions,

(5) timing/phasing of program coverage, and

(6) resources required.

The following subsections discuss each of these program scope decision points and the approaches used by S/L agencies with operating programs.

2.1 SELECTING POLLUTANTS OF CONCERN

2.1.1 General Approaches

Two general approaches have been taken by S/L agencies in selecting toxic air pollutants for review or regulation. Under one approach, a specific list of toxic air pollutants is prepared. In the second approach, the agency addresses any substance of concern. Each of these approaches has certain advantages and disadvantages.

One point to keep in mind when considering these two approaches is that, under either approach, once the total number of pollutants regulated reaches a certain level (e.g., 100-300), the number of additional sources covered may decline. That is, sources typically emit mixtures of pollutants. As a result, regulation of a specific compound often results in simultaneous control of other compounds emitted by a source. Consequently, listing hundreds of pollutants may not necessarily expand the universe of regulated sources.

1. Specific List of Pollutants. One advantage of defining a specific list of toxic air pollutants is that an agency may scope or limit their air toxics program efforts and focus their resources on the selected pollutants. The amount of research

required for identifying pollutant health effects associated with exposure to a specific pollutant and emissions estimates would likely be less than for the open-ended approach. Also, by defining a specific list of pollutants, the agency may, in effect, let industry and the public know what to expect, and thereby create a more cooperative atmosphere. Also, as mentioned above, control of one toxic pollutant is likely to control several other types simultaneously without their specific regulation.

A disadvantage of defining a specific list of pollutants is that it may be difficult to add new pollutants to the list. Depending on legal and regulatory constraints, the additions may have to be approved by an administrative board or by the legislature. Some pollutants may inadvertently be left off the list, even though they represent a significant potential for exposure and/or risk to the population. Conversely, the longer the list becomes, the more the resources that must be devoted to data collection and management. Finally, there may be public controversy over which pollutants are selected and the rationale for their selection.

Regardless of the number of pollutants covered, it is important to incorporate some degree of flexibility into the procedure for listing pollutants. Such flexibility includes the ability to add or delete pollutants as new information becomes available, and to prioritize in some manner regulatory efforts among various categories of pollutants. Generic language can be included in the regulation (or policy) that requires public notice, but not legislative action, before adding to or deleting from the list. Some agencies note that such flexible procedures make the list of pollutants a "living list" that may change considerably over time. For example, a flexible list would make it easier to incorporate the approximately 200 pollutants contemplated for regulation under proposed Clean Air Act amendments. Wisconsin is an example of a State with a flexible list of regulated pollutants.

Generally speaking, S/Ls have listed more than 100 pollutants in their programs. There is widespread consistency in listing carcinogens; the choice and number of noncarcinogens vary widely.

2. Open-ended Approach. Because of the disadvantages mentioned above, some agencies have found it overly constraining to be limited to a specific list of

pollutants. An advantage offered by an open-ended approach is that the agency can regulate emissions of any toxic substance without undertaking a formal pollutant selection process. Texas is an example of a State that has adopted this approach. Texas regulates all noncriteria pollutants under their air toxics program.

One disadvantage of the open-ended approach is that the number of pollutants addressed may become very large, such that research into health effects and emission rates for such a large number of pollutants may have to be rather cursory. Data collection and management may become resource-intensive. To address this concern, Texas uses screening values based on available health effects information and on their own staff evaluations when reviewing sources. Also, industry may not know what is expected and may be concerned that an open-ended approach does not define a specific control plan.

A combination of these two approaches has also been used. Typically, a specific, yet flexible list is used for existing sources, and an open-ended approach for new sources.

2.1.2 Steps for Selecting Pollutants.

To select pollutants, S/L agencies have proceeded through one or more of the following steps:

1. Review chemical lists, such as Superfund Amendments Reauthorization Act Title III (SARA Title III), American Conference of Governmental Industrial Hygienists (ACGIH), or lists from States with operating programs,

2. Evaluate of the health effects of individual chemicals,

3. Evaluate of the expected occurrence of emissions of individual chemicals,

4. Seek internal assistance from divisions within the agency, and

5. Seek external assistance from such sources as Air RISC, IRIS, special task forces or work groups.

The methods are discussed independently of one another in this section. However, it should be emphasized that pollutant selection actually involves completion of some or preferably each of these steps. Table 2-1 summarizes the basis for selecting pollutants by nine S/L agencies.

Step 1: Chemical Lists. There are many pollutant lists that can be reviewed. These include the list of 400+ hazardous chemicals listed under SARA Title III (listed in the Toxic Chemical Release Inventory reporting Form R -- EPA-560/4-88-005), and EPA's list of pollutants with unit risk factors (see Table 1-7), or for which EPA has developed inhalation reference concentrations (see Table 1-5). Table 2-2 summarizes several groups that publish lists of carcinogens. In addition, as shown in Table 2-1, S/Ls also incorporate pollutants from lists published by ACGIH, OSHA, and NIOSH. The Data Base Report on State, Local, and EPA Air Toxics Activities (EPA-450/3-89-29) published annually by the National Air Toxics Information Clearinghouse (NATICH), also has pollutant lists for the many States that set ambient limits. In many cases, S/L agencies have used one or more of these lists in developing their own list of toxic air pollutants. For example, North Carolina used an initial screening process in which they identified pollutants that appeared on the lists of at least five other States. This list, coupled with a review of North Carolina's emissions inventory data, resulted in an initial list of 67 pollutants of concern. About 30 more chemicals were subsequently added to North Carolina's list.

While lists of pollutants may be appropriate for the purpose for which they were prepared, they should not necessarily be adopted in toto by another agency because the types of industries and chemicals used differ from area to area. Other States' lists can, however, serve as a good starting point for identifying pollutants of initial concern. The derivation of any other State's list under consideration should be checked by contacting the particular State to help determine the similarity between industry and emission characteristics. Discussions with the appropriate personnel in a State or local agency may also shed light on the rationale for pollutant selection used by that agency. In other words, any list must be "customized" to meet a State or local agency's own needs.

TABLE 2-1. CASE EXAMPLES: BASIS FOR POLLUTANT SELECTION

Agency	# of Pollutants	Source of Information [a]	Basis for Selection	Comments
Connecticut	>800	o IARC, ACGIH, NCI, NTP, OSHA, NIOSH o CT House Bill 7204	o Carcinogens o Suspect carcinogens o Substances with established maximum allowable occupational exposure limits o NY's 16 high toxicity compounds	o Program includes a 7 member Hazardous Air Pollutant Review Panel.
Indiana	28	o Consultant Study o Board of Health Survey	o Physical/chemical characteristics	o Pollutants selected reflects use in State, Board of Health can add or delete substances.
Kentucky	92 (Existing sources) 736 (New sources)	o NTP o ACGIH		o Not all selected pollutants are emitted in State currently, but State is planning for industry growth.
Maryland	All noncriteria pollutants (new) 600 (existing)	o OSHA, IARC, NTP, SARA Title III		
New Jersey	11	o IARC, NCI	o Potential for emission and exposure (volatile) o Human or animal carcinogen o Production in United States greater than 200,000 kg/year	o Regulation does not apply to toxic VOC's which were not deliberately added to or formed in finished or raw product, do not exceed 0.25 percent of weight of raw or finished product, and are not emitted in excess of 0.1 lb/hour.
North Carolina	116	o Lists of other agencies o Pollutants/SIC code crosswalk o Preliminary screening	o Potential for emission in NC o Adverse health effects o Associated with exposure	o Program is still in proposal stage.
Pennsylvania - Philadelphia	99	o ACGIH, NTP	o Pollutant emitted in Philadelphia o Human carcinogen o Suspected carcinogen	o 7 member ad hoc advisory committee recommended ambient air quality guidelines.

TABLE 2-1. CASE EXAMPLES: BASIS FOR POLLUTANT SELECTION

Agency	# of Pollutants	Source of Information [a]	Basis for Selection	Comments
Texas	All noncriteria pollutants	o In-house health effects review capability o Screening list of pollutants not subject to health effects review.	o Case-by-case permit review based on modeling and health effects review.	
Washington	93	o Screening inventory o Potential/likelihood of emission in State o Availability of emission factors and other data	o Toxicity	
Washington - Puget Sound	32	o Material Safety Data Sheets o Annual source registration	o All pollutants emitted >1 ton/year from registration	o No limit placed on number of pollutants that can be selected

[a]IARC means International Agency for Research on Cancer
ACGIH means American Conference of Governmental Industrial Hygienists
NCI means National Cancer Institute
NTP means National Toxicology Program
OSHA means Occupational Safety and Health Administration
NIOSH means National Institute for Occupational Safety and Health
SARA Title III means Superfund Amendments Reauthorization Act

TABLE 2-2. LISTS OF CARCINOGENIC COMPOUNDS

Group	Special Features
National Toxicology Program (NTP)	Also publishes results of Mutagenicity and Teratogenicity testing.
International Agency for Research on Cancer (IARC)	Uses weight of evidence classification scheme.
Occupational Safety and Health Administration (OSHA)	Publishes list of carcinogenic compounds for hazard communication and regulatory purposes.
American Conference of Governmental Industrial Hygienists (ACGIH)	Has proposed system to indicate carcinogenic potential and potency.
Environmental Protection Agency (EPA)	Maintains list of unit risk factors for certain carcinogens and has prepared a weight of evidence system.
Agency for Toxic Substances and Disease Registry (ATSDR)	Prepares risk assessments of hazardous compounds at Superfund sites.

Step 2: Expected Occurrence. A second step in selecting toxic air pollutants is to evaluate the likelihood of a substance's use and emissions within a State or region. This step identifies which pollutants are actually emitted or anticipated to be emitted, but does not provide an indication of the pollutant's toxicity.

Several data sources are available to determine which pollutants are used/emitted. These include literature reviews, questionnaires and SARA Title III reports, monitoring data, source testing/stack sampling, and the criteria pollutant inventory.

Literature reviews.

Literature reviews are less expensive than some other sources of data. An excellent starting point for a literature review is the Bibliography of Selected Reports and Federal Register Notices Related to Air Toxics, published annually by NATICH. The Bibliography is a three-volume set (plus an index) containing over 1850 bibliographic citations to reports and Federal Register notices related to air toxics (EPA-450/5-87-005, EPA-450/5-88-005, EPA-450/3-89-25). To facilitate the use of the Bibliography, citations are indexed by document type, pollutant name or class, Chemical Abstract Service (CAS) number, source category and Standard Industrial Classification (SIC) code, and sponsoring agency. (The index is EPA report number EPA-450/3-89-25a.) The information contained in the bibliography is also available through the NATICH on-line database.

For information on accessing the NATICH database online. call the Clearinghouse Staff at (919) 541-0850.

Another important source of information on emissions sources for individual pollutants and source categories is the Locating and Estimating Emissions series of documents published by EPA. This series of documents, known as the "L&E documents", compiles available information on sources and emissions of various air

toxics. The series includes documents on almost two dozen of the highest priority pollutants, such as acrylonitrile, chloroform, formaldehyde, chromium, ethylene oxide, and others. The documents contain information on emissions from production of each chemical, emissions from its major uses, emissions from miscellaneous sources, and source test procedures.

For information about the L&E documents, call (919) 541-5522, and request the brochure, "Tools for Estimating Emissions of Air Toxics".

Questionnaires to sources and SARA Title III reports.

Information from questionnaires or surveys on a facility's production, use and storage of chemicals can indicate the types of pollutants expected to be emitted. Surveys might be sent to all sources or specific surveys might be developed for selected source categories. The EPA documents Compiling Air Toxics Emission Inventories (EPA-450/4-86-010, currently being updated) and Compilation of Air Toxics Emission Inventory Questionnaires (EPA-450/4-88-008) provide useful information on identifying potential sources of air toxics and designing questionnaires for industry surveys.

Toxic chemical data from SARA Title III Sections 312 and 313 inventories also can be used for this purpose. By serving as a screening tool, a production/use/storage evaluation may best fit the needs of an agency just beginning to develop an air toxics program. The results of the production/use/storage evaluation could focus the efforts of follow-up, detailed data gathering. The use of SARA Title III data or questionnaires is relatively less expensive than other data gathering methods. Such data could also serve as the cornerstone for an air toxics emission inventory.

SARA Title III Section 313 requires EPA to establish a toxic release inventory and to make the toxic emissions data available to the public through a national Toxic Chemical Release Inventory (TRI) data base. The TRI data base is accessible by

Chemical Release Inventory (TRI) data base. The TRI data base is accessible by S/L agencies as well as the general public. See subsection 4.3.3.1 for further discussion of SARA Title III and how to access the TRI database.

Monitoring data.

A third way to determine which pollutants are emitted is to conduct monitoring. Ambient monitoring can provide definitive indications of the presence of a toxic pollutant in ambient air. However, proven ambient monitoring and analytical methods have not yet been developed for all toxic pollutants. Naturally occurring and secondary pollutants also need to be considered. Monitoring is very expensive and may not be a necessary step in pollutant selection in the beginning stages of an air toxics program when less expensive methods can be used. Existing monitoring programs for criteria pollutants can also be used for air toxics identification. This topic is discussed in more detail in Section 4.3.2.2.

Source testing/stack sampling.

Source testing/stack sampling can determine which pollutants are actually emitted. Modeling of the measured emission rates can be used to estimate ambient concentrations. However, source testing is very expensive and is usually not an option that is available to most S/L agencies.

Criteria pollutant inventories.

Criteria pollutant inventories offer another source of data. This topic is discussed further in Section 4.3.2.2.

Step 3: Health Effects Evaluation. Another step in selecting toxic air pollutants is to examine the known or expected health effects resulting from exposure to the pollutant. The primary advantage of this method is that the pollutants that have the greatest potential to cause adverse health effects are identified. However, the major disadvantage to this method is that it does not identify pollutants actually emitted in the area, and hence, resources could be devoted to gathering information

on pollutants that are not truly a problem in the State or region. Therefore it is recommended that the expected occurrence of pollutants be evaluated prior to a health effects evaluation.

The major issue when selecting pollutants on the basis of health effects is how to define measures of toxicity. In other words, what toxic effects will warrant listing and how much experimental evidence of those effects is necessary? Many agencies agree that all carcinogens should be listed. As shown in Table 2-2, lists of known and suspected carcinogens are published by various groups.

The National Institute for Occupational Safety and Health (NIOSH) maintains the Registry of Toxic Effects of Chemical Substances (RTECS) database. RTECS is an online interactive version of the NIOSH publication of the same name. It provides data for 90,000+ potentially toxic chemicals, including toxicity data, chemical identifiers, exposure standards, National Toxicology Program test status, and status under various Federal regulations and programs.

Many S/L agencies have frequently used the ACGIH list of chemicals as a basis for pollutant selection, particularly for noncarcinogens. The ACGIH list is especially useful for identifying substances used in the workplace that are toxic and have the potential to be emitted into the ambient air.

Finally, EPA's Integrated Risk Information System (IRIS) is an important source of information on the health effects of over 260 chemicals. The IRIS was described above, in Section 1.2.2.3.

Step 4: Internal Assistance From Divisions Within the Agency. Another method of choosing pollutants to list is requesting recommendations from agency divisions outside the air pollution group. The public health department or division can identify toxics associated with public health problems in the State or locale. The water pollution department or division may be able to provide information on the most frequently discharged water pollutants. The air pollution group can then evaluate how those substances are used in industry and whether the substances may be emitted and become airborne pollutants. The same approach may be applied to information obtained by the State hazardous waste management staff. Permits issued

under the Resource Conservation and Recovery Act (RCRA) contain lists of the constituents of hazardous waste handled by a facility. The air pollution group could evaluate chemicals on those lists for the potential for the pollutants to be emitted to the atmosphere, based on their use in industry. The overlap of toxics programs and RCRA is discussed further in Section 4.3.2.2.

Step 5: External Assistance. Several agencies have requested assistance from individuals or groups outside the agency during development of a list of pollutants or after pollutant selection, as an external review. Toxicologists and physicians from local medical and research institutions can assist in evaluating health effects of toxic pollutants. Consultants and members of the academic community can perform technical review of potential sources and quantities of the toxic pollutants listed as well as review of the policy implications in listing pollutants. Personnel from outside of the agency can give different perspectives on policy issues and supplement the knowledge of agency staff.

Many agencies have requested industry participation in development of their entire air toxics program, including a review of the list of pollutants to be covered. These agencies report that the success of their air toxics programs was due in part to industry involvement that led to increased awareness and cooperation. Participation by public groups, citizens' committees, and environmental groups can yield the same benefits.

2.2 SELECTING SOURCE CATEGORIES OF CONCERN

There are three main issues with respect to source selection that S/L agencies encounter when designing an air toxics control program:

(1) What types of air toxic-emitting sources, if any, should be excluded from coverage under the program?

(2) Should the program apply to existing as well as new sources?

(3) **Should sources with very low levels of toxic emissions (de minimis levels) be exempted?**

Similar to pollutant selection decisions, resolution of these issues is critical in determining program effectiveness, and the size and nature of the regulated community.

1. Types of Sources to be Regulated. Air toxics control programs open up a whole new universe of sources that need to be considered and evaluated for possible regulation. The focus will not automatically be on large volume particulate matter (PM) or volatile organic compounds (VOC) sources as it has been traditionally. Sources that were previously viewed as being too small of an emitter (e.g., auto body painters) and/or as having configurations not easily amenable to control (e.g., small volume printers) now are being examined under toxics programs because they emit one or more chemicals deemed to present some measure of health risk. Area sources, whether large or small, that have been unregulated in many State VOC programs, must now be better identified and characterized because of the aggregate impact of their emissions. Programs based on risk levels or ambient concentration limits may bring into consideration some very small sources because, even though emission quantity is low, pollutant toxicity may be quite high. The high toxicity may trigger the review of the source under the air toxics program.

For any air toxics program, there is a strong presumption in favor of regulating all sources that emit air toxics in amounts that may pose health problems to the public. However, such a broad regulatory scope may not be practical in terms of agency resources and priorities. Therefore, the issue usually becomes, "Which sources or source categories can justifiably be initially excluded from coverage without seriously jeopardizing the achievement of the program's long-term goals?"

State and local agencies have adopted a variety of approaches to resolve this issue. There is no one correct or necessarily best approach. The resolution of the issue will depend to a large extent on the number and mix of sources in a given State or locale, the degree of risk posed by air toxics sources, the availability of controls,

the resources of the agency, and numerous other agency-specific factors. Some of the more common source exemptions are discussed below.

Mobile Sources. With the exception of California, no S/L agency currently includes mobile sources in their air toxics program because of the dominance (although not preemption) of Federal regulation in this area, and the resources required for S/L agency regulation of mobile sources. This is not to say that mobile sources are not a major contributor of air toxics exposure -- they are! However, S/L agencies have tended to focus on stationary sources for the reasons mentioned above. The only air toxics-related mobile source regulations implemented by S/L agencies are carbon monoxide and ozone State Implementation Plan measures. These measures can indirectly control air toxics through the co-control of criteria and noncriteria pollutants.

Area Sources. Area sources (e.g., dry cleaners, woodstoves, fireplaces and other small, but numerous sources) are regulated in some jurisdictions, either under air toxics regulations or separate regulations. Collectively, such sources can emit significant amounts of toxic air pollutants. Because of their large number, these sources are usually too numerous to review on an individual basis. As such, S/L agencies should carefully evaluate their ability and need to cover such sources initially.

Nontraditional Sources. A difficult issue for many agencies is the regulation of various "nontraditional" sources, such as wastewater treatment plants and hazardous waste landfills. These have been shown to be significant air toxics sources in several studies. There is a strong presumption in favor of ultimately regulating such sources; however, an agency should carefully evaluate the number, size, and type of such sources in their area to decide whether regulation would be practicable in the beginning.

Sources Regulated Under the Clean Air Act. Some States have included provisions in their regulations that exclude from State regulations pollutants regulated

under Sections 111(d) or 112 of the Clean Air Act. The Virginia regulations (Section 120-05-0301) state, "The provisions of this rule do not apply to the following:

> Hazardous air pollutants regulated under Section 112 of the Federal Clean Air Act, except to the extent such pollutants are emitted from facilities which are not subject to emissions standards in Rule 6-1." (Rule 6-1 includes Section 112 standards enforced by Virginia).

By including such "generic" exemptions, an agency would not have to amend its regulations when additional 112 or 111(d) standards are promulgated or when Clean Air Act amendments are passed.

In the 1989 STAPPA/ALAPCO survey, about 17 S/L agencies said that they exempt or plan to exempt certain source categories. Table 2-3 summarizes some of the source category exemptions noted in the questionnaire responses. Several agencies noted that they exempt mobile sources and/or area sources; however, the fact that a State did not mention area and mobile sources as exempted does not necessarily mean that the State regulates those sources. Most State responses focused on point source exemptions. Before interpreting any of these exemptions, it is important to read the State's own regulatory language to avoid misconstruing the context of the exemptions.

2.3 REGULATING EXISTING SOURCES

The second major source selection issue is whether to regulate existing as well as new sources. New and modified sources are now addressed for their air toxics impacts in virtually all S/L air toxics programs. Starting with new and modified sources is a natural step because of the required review and generally more favorable control economics for these sources. Because existing sources represent the origin of all existing toxic air pollutant emissions, the question should really be viewed as, "When?" -- not whether. Ultimately, existing as well as new and modified sources should be regulated.

TABLE 2-3. SOURCE CATEGORIES S/L's REPORT EXEMPTED

California	Sources whose emissions are small are deferred so resources can be spent on source categories that pose a higher risk.
Iowa	Mobile sources.
Kentucky	NESHAP sources, laboratory equipment, dry cleaners, indirect heat exchangers using fossil fuel only, gas stations, agricultural operations.
Maryland	Fuel burning equipment, char-broilers, gas stations, NESHAP or potential NESHAP sources.
New Mexico	Gasoline service stations; automotive repair shops; laundry, cleaning and garment services; domestic wood stoves and fireplaces; oil and gas production facilities; agricultural production and services; containers, tanks, etc. without vents; nonprocess fugitive emissions from stationary sources such as construction sites and mine tailings.
New York	17 specific source exemptions including certain petroleum liquid storage and transfer facilities, certain solvent metal cleaning processes, certain surface coating operations, perchloroethylene dry cleaning facilities.
Wisconsin	Depends on pollutant. Exemptions include combustion of certain fuels, laboratories, certain gasoline dispensing facilities, incinerators, indoor fugitive emissions, and certain wood combustion.
CA-Ventura	Gasoline dispensing operations using Phase I and II vapor recovery system, small perchloroethylene dry cleaning facilities.
KS-Kansas City	Existing sources.
KY-Louisville	Service stations, dry cleaners, fossil fuel burners.
NV-Las Vegas	Dry cleaners, gas stations, businesses consuming less than 1000 gallons of solvent per year.

TABLE 2-3. SOURCE CATEGORIES S/L's REPORT EXEMPTED (Continued)

PA-Philadelphia	Commercial fuel combustion sources, retail dry cleaners, gasoline service stations, incineration other than by-product industrial work, and a list of "incidental" sources exempted from emission reporting, but not from "no health hazard" requirement.
WA-Seattle	29 specific source exemptions including certain types of the following: fuel burning equipment, internal combustion engines, laboratory equipment, storage tanks, water cooling towers and ponds, restaurants, cold solvent cleaners, gas stations, and dry cleaners.

One possibility is to establish more flexible requirements for existing sources such as process changes, raw material substitution, and other pollution prevention initiatives. Another approach for States with a smaller population of high risk point sources is to address each problem source on a case-by-case basis using general air pollution control/health protection authority.

One concern in the regulation of existing sources is how to cover sources that typically do not have to obtain air quality permits, but that are toxics emitters. The coverage of existing sources, either immediate or in a phased approach, presents additional implementation problems in terms of applicability determination. If the coverage is immediate, all sources emitting chemicals of concern will need to be identified and evaluated according to the basis of the program (i.e., emission limits, acceptable ambient levels, etc.). Many emitters of toxics will not be traditionally-regulated PM and VOC sources, and inventories of such sources will likely not exist. Whether the program has immediate or phased coverage for existing sources, the identification of sources releasing the regulated chemicals may present problems for the source types not traditionally regulated or permitted.

The inclusion of existing sources at some point should definitely be an element in the design of any air toxics program. In the STAPPA/ALAPCO survey, 20 States and 7 local agencies reported that they regulate or have definite near-term plans to regulate emissions from existing sources. Many agencies that have a system of operating permit renewal in place begin to regulate existing sources on this cycle of permit renewal. In these cases, existing sources are exempt, or control is deferred, until their operating permit comes up for renewal. For programs covering existing sources in a phased approach under their criteria pollutant program, attention needs to be paid to the frequency and requirements of the permit renewal system. The review cycle should be reasonably short (i.e., no more than 5 years) and capable of imposing substantive new control requirements in order to be effective. In addition, Clean Air Act amendments that have been proposed include operating permit programs capable of assessing and collecting a fee which would compensate the reviewing agency for its time and expense.

2.4 SELECTING SIZE AND EMISSION CUTOFFS/EXEMPTIONS

A fourth major decision point in determining the scope of an air toxics program is the selection of size and emissions cutoffs/exemptions. Such cutoffs/exemptions are a standard feature of most programs either as source screening levels or regulatory exclusions. Several of these agencies have stressed that this is one of the most critical decisions associated with launching a new program. There are at least two ways to structure such cutoffs/exemptions.

1. Lower Size Cutoff. One approach is to apply lower size cutoffs. These can either be source-specific (e.g., production rate) or tied to the definition of a major source/major modification (e.g., regulations apply only to sources classified as major under criteria pollutant programs).

2. Emissions Cutoffs/Exemptions. Another approach is to apply de minimis emission cutoffs or exemptions. Some agencies use stack concentrations while others use emission rates. Some cutoffs/exemptions are pollutant specific (e.g., Maryland, North Carolina). Others are generic (e.g., Pennsylvania exempts any source whose stack concentration is no greater than the applicable AAL). Table 2-4 summarizes the de minimis emission levels reported by S/L agencies responding to the STAPPA/ALAPCO survey. For a complete understanding of these exemptions, readers should consult each agency's regulations.

2.5 TIMING/PHASING OF PROGRAM COVERAGE

The development of an air toxics program is clearly not a one-time effort, but rather an ongoing task that requires multiple iterations (e.g., evaluation of how current practices are meeting agency objectives, revision of practices to meet objectives, and development of new objectives). Some agencies have planned their air toxics control program to be implemented in several phases or generations. For

instance, they may target certain high risk point sources in the first generation and then look at "urban soup" in the second or third generation of their program.

2.6 AGENCY RESOURCE REQUIREMENTS

As mentioned previously, agency resources are a key factor to consider before the scope of the program is defined. Some agencies have deferred control of certain sources or pollutants due to their limited available resources. Another approach is to require industry to provide information such as emissions data, monitoring data, and modeling results to the agency, thus saving the agency's resources that would be needed to perform these tasks. The Maryland Air Management Administration used such an approach during the development of their program. Maryland felt that significant agency resources were conserved this way.

The 1989 STAPPA/ALAPCO survey asked for dollar and work hour allocations devoted to air toxics programs in the past year for specific work areas, such as permitting, program development, and monitoring. The STAPPA/ALAPCO document can be referenced for program allocations for individual S/L agencies.

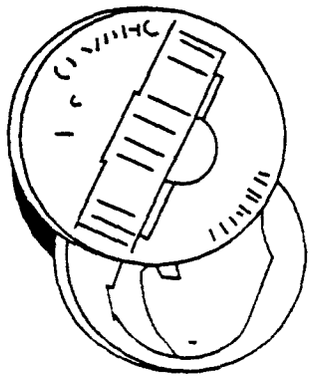
For information on obtaining the compilation of the results of the 1989 STAPPA/ALAPCO survey, contact STAPPA/ALAPCO at (202) 624-7864.

TABLE 2-4. DE MINIMIS LEVELS REPORTED BY S/L AGENCIES

California-Bay Area AQMD	Noncarcinogens: acceptable exposure value/4 expressed as an ambient concentration (g/m^3) and as emission rates (lb/day). No exemptions for carcinogens.
Kentucky	Pollutant-specific emission levels are given in lbs/hr in regulations for new and existing sources
Maryland	Noncarcinogens: <5 lbs./hour if screening level is >200 ug/m^3. Carcinogens: same as above, but also <350 lbs/yr if screening level for carcinogenic effect is > lug/m^3.
Michigan-Detroit	Case-by-case
Nebraska	2.5 tons/year
Nevada	0.25 lb/8 hours
New Mexico	Applicability thresholds are pollutant-specific and presented in the regulation as emissions in lbs/hr and lbs/yr.
New York	Emissions potential of <3.5 lbs/hr of VOC for sources not given an "A" environmental rating.
Oklahoma	Low toxicity pollutants: 6 tons/yr, not to exceed 5.6 lbs/hr Moderate toxicity pollutants: 1.2 tons/yr, not to exceed 1.1 lb/hr High toxicity pollutants: 1,200 lbs/yr, not to exceed 0.57 lbs/hr.
Oregon	Compound-specific de minimis limits for list of pollutants.
Pennsylvania	No definite cut-off established yet for many smaller sources. Their exempted status is based more

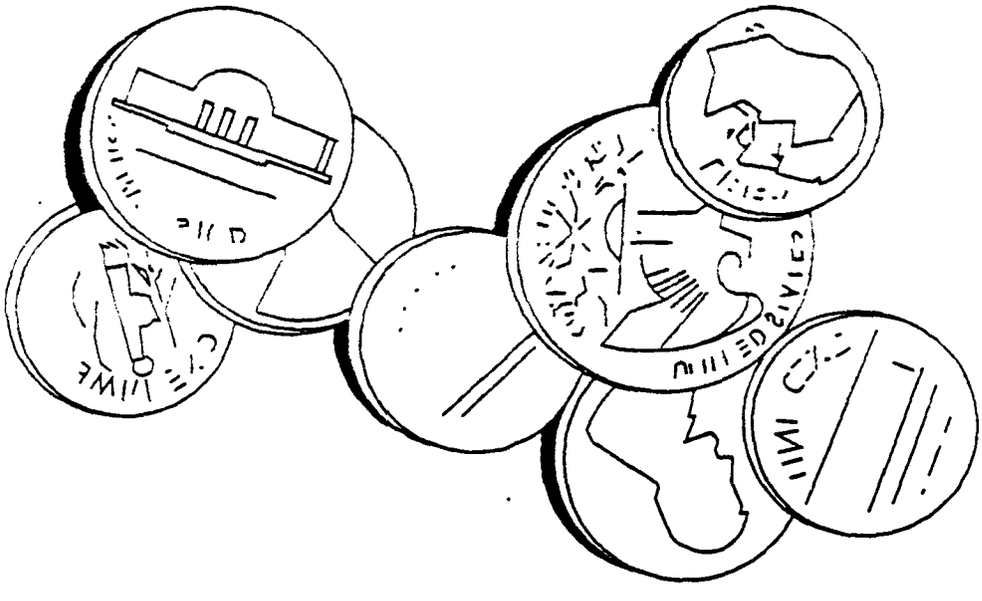
TABLE 2-4. DE MINIMIS LEVELS REPORTED BY S/L AGENCIES (Continued)

	on resource limitations than on a defined de minimis level.
Pennsylvania-Pittsburgh	Pollutant-specific, less than air toxic ambient guideline in the stack or emission stream.
Rhode Island	Regulations give emission levels in lbs/hr for 40 pollutants.
South Carolina	<1.0 lb/hr of PM uncontrolled <1,000 lb/mo VOC uncontrolled
Tennessee	Ambient levels listed for pollutants specified in PSD regulations.
Vermont	Compound-specific levels given in pollutant list, expressed in lb/8 hours.
Virginia	Emission rates in lb/hr depend on ACGIH TLVs:
	<1 — 0. 1-2 — 0.13 3-5 — 0.76 6-12 — 1.52 13-25 — 3.29 26-50 — 6.58 51-250 — 12.90 251-500 — 63.51 501 or greater — 126.77
Washington-Seattle	Case-by-case consideration.
Wisconsin	Regulation gives emission rate in lb/hr for listed pollutants.
Wyoming	Determined on the basis of impact and exposure.



SECTION 3.0

EVALUATING PROGRAM IMPACTS



3.0 EVALUATING PROGRAM IMPACTS

Highlights of This Section

- Evaluation of program impacts, at least to some degree, may be necessary for either legal or practical reasons.
- Agencies should plan such evaluations carefully to ensure results are credible and program approval is facilitated.

3.1 WHAT ARE THE COSTS?

Documentation of the estimated costs of proposed air toxics regulations is often an important issue. Estimates of agency implementation costs may be needed for administrative purposes, and estimates of the cost to affected industries may also be needed. Effected industries and the public at large have legitimate needs for information concerning the likely consequences of proposed State or local regulations. For this reason, laws in many States and locales require disclosure of the estimated impacts of a rule prior to its adoption.

In the case of air toxics programs, documentation of program impacts may be necessary for strategic as well as legal reasons. Some S/L agencies have found it necessary to prepare such evaluations simply to respond to industry claims that businesses would experience unreasonable economic impacts. Regardless of the reason, as a practical matter agencies may find it difficult to convince their governing boards or commissions of the reasonableness of the proposed rules without such an evaluation. Consequently, at least some cost and/or economic impact evaluation may be a prerequisite for obtaining program approval.

Agencies should plan such evaluations carefully before starting. Estimating the costs to industry of proposed air toxics controls, especially for existing sources, can be expensive and time-consuming. If economic impacts are included, the task becomes

even more challenging. Because of the many assumptions required, the validity of cost or economic evaluations is easily challenged. Consequently, such evaluations should be carefully designed to ensure that the results are credible and the evaluation will facilitate the program approval process.

The following two subsections describe the economic impact analyses undertaken by the States of Maryland and North Carolina, respectively. The approaches taken by the two States differ considerably. Maryland chose not to estimate emission reductions, costs, or risk reduction on a source-specific basis. Instead, a cost-screening analysis of four types of facilities was performed and control costs were assessed qualitatively. North Carolina chose a more quantitative approach by performing source-specific dispersion modeling, calculating emission control costs, and estimating exposure and risk reductions.

3.2 SELECTING A METHODOLOGY: MARYLAND's APPROACH

Maryland's Air Management Administration prepared a cost analysis of their proposed regulatory program in 1986. Maryland is now in the implementation phase of their program. The analysis by Maryland had two primary components: the cost to businesses to comply and the administrative cost of implementing the regulations.

The Department estimated that about 800 existing installations at about 320 existing premises would be subject to the proposed regulations, in addition to about 140 to 150 new installations per year. Existing premises would be reviewed gradually over the first four years, and then reanalyzed on approximately a three-year cycle.

These estimates were based on a registration system that tracks new and existing installations that discharge air emissions. To estimate the number of effected facilities, the Department counted all installations required to obtain an operating permit that is renewed annually, and subtracted installations for fuel burning equipment because they are exempt from the regulations. The number of new installations per year was based on a review of permit data from 1984-86. The Department did not attempt to estimate the effect of small source exemptions in the regulations, or related tasks companies are required to perform to comply with the

Superfund Amendments Reauthorization Act (SARA). As a result, their estimates were considered conservative.

3.2.1 Compliance Costs

For the analysis of the compliance costs to business, three categories of costs were estimated:

- o emissions estimation costs,
- o air quality modeling costs, and
- o emissions control costs.

The Department did not attempt to quantify certain other possible costs to business, such as monitoring, risk assessment, and health effects data collection costs.

Emissions Estimation Costs. Emissions estimation costs were divided into two categories: (1) costs of performing stack tests, and (2) costs of estimating air toxics emissions using other methods.

1. Stack Tests. To estimate stack testing costs, the Department worked through the following calculations:

(1) (Total number of installations reviewed annually)
(2) X (Percentage of installations requiring tests)
(3) = Number of installations requiring tests
(4) (-) Number of tests performed by the Department
(5) = Total industry tests

Then the Department estimated the average costs per stack test. They estimated a cost of $70,000 to $100,000 per test for complex installations. An estimate of $20,000 to $40,000 per test was used for less complex installations. Based

on these estimated stack test costs and the estimated number of installations tested each year, the Department estimated the total cost of emissions estimation for businesses for the first four years of the program. The range in annual costs was $75,000 to $260,000.

2. Other Methods. The Department used a similar procedure to calculate the costs of estimating emissions using methods other than stack tests. All installations were assumed to perform this type of estimation. Installations were categorized as either complex, moderate, or simple to reflect the varying costs for estimating emissions. Then the Department approximated costs for both high and low cost scenarios for each category.

Using this procedure, the Department estimated that annual costs for non-stack testing methods ranged from approximately $96,000 to $398,000 per year.

In response to industry concerns about the cost of emissions estimation using these other methods, the Department took several steps to minimize cost impacts. They included:

- Allow existing installations plenty of time to estimate emissions by phasing in the program over four years,
- Require existing premises to quantify emissions only for specifically listed compounds,
- Provide de minimis emission cutoffs,
- Provide "back calculation" procedures for estimating emissions from physical source data and screening levels,
- Conduct a series of workshops to familiarize businesses with emission estimation and modeling methods, and
- Provide assistance to businesses unable to develop estimates.

Modeling Costs. For this estimate, it was assumed that modeling would be done for entire premises, since the ambient impact requirements of the program apply to entire premises rather than individual installations.

Based on a screening study of approximately 50 premises, the Department assumed that about 70 percent of the regulated premises would be able to demonstrate compliance using the Department's conservative screening dispersion model (TM 86-02). This would involve only minimal costs to those businesses.

To estimate the number of businesses required to perform more rigorous modeling, the Department assumed that about 50 percent of new installations will be constructed at existing premises. The Department further assumed that about 70 percent of new installations located at existing premises would be part of premises that do not have operating permits. These assumptions were based on department permit data. For purposes of making the analysis conservative, the Department assumed that each new installation locating at a new premise and each new installation locating at an existing premise without an operating permit would be required to perform the more rigorous modeling.

Using these procedures and assumptions, the Department estimated that about 570 premises would incur minimal modeling costs by using TM 86-02 or other low-cost methods. Nearly 250 premises would require additional modeling. The Department expected to perform the modeling for about 220 of these. Thus, only about 4 percent of the regulated premises were assumed to incur modeling costs.

For more complex premises, the Department assumed average modeling costs of from $15,000 to $30,000. Very complex premises were estimated to incur average costs of from $50,000 to $70,000. By multiplying the average modeling costs by the aggregate number of premises estimated to incur such costs, aggregate modeling costs ranging from about $195,000 to $460,000 annually were estimated.

Emission Reduction Costs. For this category of cost impacts, the Department chose not to provide detailed source-specific and aggregate estimates of emission control costs because of the expense of such an analysis for the Department, confidential plant data, and because of the heterogeneous nature of the different

facilities involved. In lieu of a source-specific analysis, the Department performed a cost screening analysis of selected existing facilities and qualitatively assessed the control cost implications of the proposed program.

The Department adopted a source-specific regulatory approach using a conditional standard to create the most cost-effective regulation. This approach allows a case-by-case appraisal of the costs and benefits of controlling each source. Also, sources are allowed to choose the method of compliance which is least costly given their individual characteristics. Options include choice of control technology, substituting different raw materials, making process changes, proposing higher acceptable levels, and, in some cases, increasing stack heights. This flexibility was another reason why the Department found it difficult to estimate the statewide impacts of their proposed program.

To estimate the impacts on new installations, Department staff, with the assistance of a contractor, evaluated the cost of meeting the States proposed T-BACT and ambient impact requirements for four types of facilities, including:

- dry cleaners discharging perchloroethylene,
- a refractory storage pile discharging chromium and aluminum oxide,
- an adhesive application facility discharging either toluene or methylene chloride, and
- a specialty steel facility discharging chromium and nickel.

The analysis showed that new commercial and industrial dry cleaners would require no additional control beyond current regulations. T-BACT was assumed to include a leak detection and repair system for controlling fugitive perchloroethylene emissions. This cost was estimated to range from $200 to $5,000 for the detector and $50 to $3,000 for subsequent annual maintenance. Costs for the refractory storage pile facility were estimated to $180,000 per year for a building enclosure with a fabric filter. No additional control costs were estimated for the adhesive application facility.

Because of New Source Performance Standards requirements, the specialty steel manufacturer was also estimated to incur no additional costs.

3.2.2 Administrative Costs

The Department evaluated administrative costs according to five categories:

(1) Personnel
(2) Laboratory equipment
(3) Data processing system
(4) Other equipment
(5) Operating expenses

Costs were estimated to range from a first year cost of about $400,000 to about $250,000 per year for subsequent years. Personnel costs included salaries and fringe benefits for three engineers, a toxicologist, a lab scientist, a data device operator, and a secretary. The Department also assumed the purchase of a gas chromatograph-mass spectrometer, sampling trains, and a sample concentrator in the first year.

3.3 SELECTING A METHODOLOGY: NORTH CAROLINA's APPROACH

The approach used in North Carolina's assessment included an examination of 325 of the approximately 3,000 permitted sources in North Carolina. The facilities selected by the State for the study represented a variety of major and minor potential sources of air toxics in all parts of North Carolina. Based on information supplied by facility owners/operators, a list of 85 facilities with emissions of air toxics exceeding trace amounts was compiled. These 85 facilities were then screened by the Division of Environmental Management (DEM) using accepted dispersion modeling techniques to determine whether ambient air concentrations exceeded the levels specified in the States proposed regulation. Facilities whose stack emissions exceeded acceptable levels under current operating conditions were modeled to determine whether ambient

air concentrations resulting from their emissions would be exceed the ambient limit if their exhaust stacks were increased to 1.5 times the building height or, failing that, to the maximum height allowed under federal Good Engineering Practice (GEP) exhaust stack guidelines.

Using the results of the dispersion modeling analysis, DEM estimated the costs of complying with the proposed regulation for each facility. For those facilities determined to be capable of complying with the regulation through use of dispersion techniques alone, the cost of an adequately-sized exhaust stack was calculated. For facilities determined to require add-on control technology, such as fabric filters or carbon absorbers, the costs of applicable add-on control systems were calculated. Cost estimates did not take into account any existing emission controls at the facilities.

Using these cost results, the potential economic effect on each facility was examined in terms of estimated product price increases and/or profitability decreases. If a facility's products could potentially experience a price increase of more than 5 percent, assuming no absorption of cost increases, the facility was predicted to experience a significant economic impact. Similarly, if a facility's profit margin could potentially drop to zero as a result of compliance with the regulation, the facility was predicted to experience a significant economic impact.

The benefits of the proposed regulation were assessed by analyzing selected facilities representing the potential range of benefit impacts and related costs resulting from the regulation. Benefits were measured in terms of the reduced human exposure to ambient concentrations of toxic chemicals in the vicinity of the example facilities. For carcinogens, benefits were expressed in terms of the reduced annual incidence of cancer for exposed populations resulting from the regulation. For noncarcinogens, benefits were expressed in terms of the number of individuals whose exposure to air toxics would be reduced to concentrations below proposed ambient thresholds. The benefit estimates were then coupled with the estimated costs of compliance for each example facility to obtain an overall indication of benefits relative to costs.

The primary findings and conclusions of the study were as follows:

- A majority of existing sources included in the survey used to develop the findings in this report (216 of 325) would not likely be affected by the proposed regulation because they do not emit any of the 116 listed toxic air pollutants in more than trace amounts. Eighty-five of the 325 sources surveyed emit more than trace amounts of one or more listed pollutant.

- Fifteen of the 85 facilities emitting more than trace amounts of air toxics would comply with proposed acceptable ambient levels under existing operating conditions.

- Seventy of the 85 facilities emitting air toxics in more than trace amounts showed ground level concentrations exceeding acceptable ambient levels for one or more of the 116 listed pollutants under current conditions. This finding is based on conservative dispersion modeling assumptions (i.e., the dispersion modeling analysis may predict higher concentrations than actually exist). In some cases, facilities did not report stack parameter data and conservative assumptions were used to assign model inputs for these emission points. More detailed dispersion modeling on a small number of facilities for the benefits analysis showed that many of these same facilities would be able to comply with the proposed regulation without further control.

- Forty-two of the 70 sources modeled in the stack height analysis could comply by raising their stack height, thereby reducing ambient impacts to acceptable levels. However, most of these would need to raise their stack to the maximum height allowed by GEP to comply.

- None of the 42 facilities required to increase their stack height to comply with the proposed regulation would likely experience significant economic impacts.

- Twenty-eight of the 70 facilities modeled would need to upgrade existing or install new add-on control systems in order to reduce ambient impacts to acceptable levels. Ten of these could potentially experience significant economic impacts as a result.

- The analysis of benefits of the proposed regulation showed that cancer cases among persons living in the vicinity of the 4 example facilities analyzed for carcinogenic pollutant emissions would be reduced from 1 case every 20 years to 1 case about every 60 years for two example facilities. Reductions in annual cancer cases for another example facility would be from 1 case every 25 years to 1 case about every 40 years.

- The cost/benefit ratio for control of sources of carcinogens ranged from a low of $90,000 per cancer case reduced to a high of $300 million per cancer case reduced. The cost/benefit ratio for the other 2 example facilities analyzed were $2 million and $33 million per cancer case reduced, respectively.

- In the case of noncarcinogens, the number of exposed individuals would be reduced by 10 near 1 of the 4 example facilities analyzed and by 1,960 near another example facility. The number of exposed individuals would be reduced by 229 and 1,760 near the other 2 example facilities, respectively.

- The cost/benefit ratio of control for sources of noncarcinogens ranged from a low of $9 per exposed individual to a high of $160 per exposed individual.

North Carolina's experience with attempting to estimate program cost and economic impacts was similar to Maryland's. The North Carolina DEM completed their analysis after more than two years work by agency and contractor personnel. The report, published in April 1987, subsequently underwent intense scrutiny by several industry groups and individual companies. Industry representatives criticized the report on several grounds, most especially because the cost estimates did not include any direct cost input from individual plants.

Subsequently, the North Carolina Department of Commerce commissioned a professor in the business school of a local university to critique the DEM report. The critique contended that the analysis was unreliable because of several factors not considered in conducting the analysis. The critique concluded by stating that a reliable study would be very time-consuming and expensive to carry out.

North Carolina's effort to analyze the cost and economic impacts of their proposed air toxics regulation raised the same basic issue as Maryland's effort: how to accurately estimate a program's impacts within available resources. North Carolina's study, which included dispersion modeling, control cost estimation, economic impact analysis, and cost/benefit analysis for several dozen sources, cost approximately $65,000. At a minimum, a truly comprehensive assessment of cost and economic impacts would require several hundred thousand dollars and the collection of detailed

plant-specific data from numerous sources. As of the drafting of this manual, a bill was pending in the North Carolina General Assembly to more clearly define what constitutes an "adequate" cost and economic impact evaluation for a proposed state regulation.

3.4 PLANNING A COST OR ECONOMIC IMPACT EVALUATION

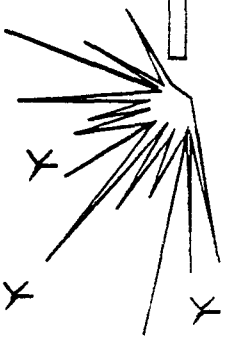
Where preparation of a cost or economic impact evaluation is necessary either for legal or practical reasons, plans for the analysis should be carefully considered before commencing work. A list of considerations to aid the planning of such an analysis appears in Table 3-1.

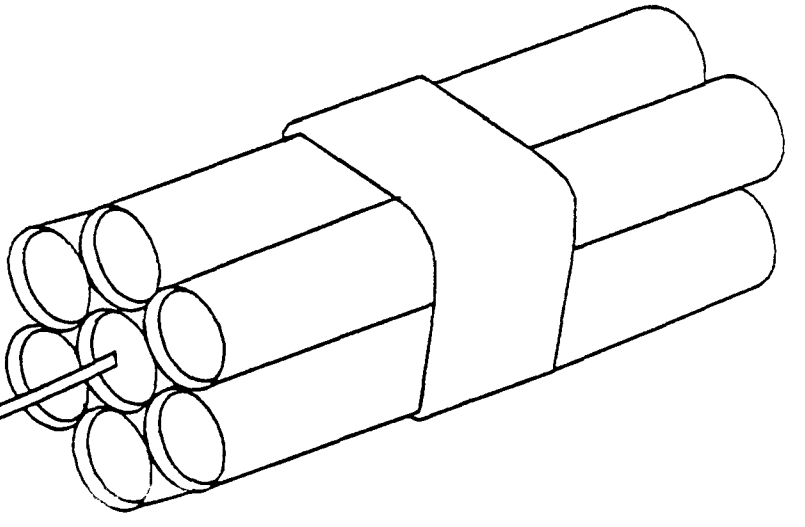
TABLE 3-1. CONSIDERATIONS IN THE PLANNING OF REGULATORY IMPACT EVALUATIONS

- Carefully consider the goals and uses of the analysis.
- Consider the types of impacts that are most relevant to program approval and focus the analysis on those impacts.
- Evaluate the acceptability or credibility of the results if the scope of the analysis must necessarily be limited.
- Use accepted and defensible methodologies, especially if major simplying assumptions are necessary.
- Involve industry and other outside advisors in the design of the analysis.
- Use actual plant data to the fullest extent possible.
- Avoid reporting aggregate statewide costs unless confident of the accuracy of the estimate.
- Carefully consider the representativeness of the sources analyzed.
- Report the results in a manner easily understood by the public.

SECTION 4.0

AVOIDING PITFALLS





4.0 AVOIDING PITFALLS

Highlights of This Section

- Challenges to a proposed program should be anticipated and sound responses developed.
- An effective communications strategy can be essential to the success of a program.
- Duplication of effort can be avoided and resources conserved by coordinating with other toxics-related regulatory programs.
- Administrative progress and control effectiveness should be measured both qualitatively and quantitatively to ensure program goals are achieved.

4.1 DEFENDING THE PROGRAM ALONG THE WAY

This subsection summarizes some of the most common charges leveled against proposed S/L air toxics programs by those opposed to their approval. Air toxics programs have been controversial in some States and their approval may require a strong defense of the program's need and features. Opposition by parties affected by the regulations should be anticipated. Understanding the likely adverse comments and developing sound responses to those comments early in the process may be one of the most important tasks in the development of a program.

A valuable piece of advice from an experienced former air toxics program official is to build a network of S/L agency staff contacts to counsel you, especially during the program design and approval stage. Conferring with others who have already encountered similar opposition can be extremely helpful in answering questions, testing out responses, and building confidence. The Data Base Report on State, Local, and EPA Air Toxics Activities (EPA-450/3-89-29) published annually by

the National Air Toxics Information Clearinghouse (NATICH), includes an extensive list of S/L contacts in various program areas.

Table 4-1 highlights some of the most likely comments and offers some suggested responses, based on the experience of S/L agencies who have successfully defended their programs.

4.2 ENSURING EFFECTIVE COMMUNICATION

This subsection discusses ways to communicate effectively with interested parties during program development and implementation.

4.2.1 Communicating Early and Often

At EPA workshops on air toxics program development held across the country, one of the topics for group discussion was the nature of communication needs in air toxics program development and implementation. The consensus of those discussions was "Communicate early and often! The success of your program will depend on it!"

4.2.2 Understanding the Nature of Environmental Communication

Communicating successfully requires an appreciation of the unique nature of environmental communication. Communication on environmental issues is distinctive in four ways. The first is distinctive feature is the complexity of information. Environmental communication frequently involves complicated subject matter such as science, economics, law, business management and human behavior, with their trade-offs and interactions. The second way is the gap in technical knowledge of the general public. Technical information is presented about problems and solutions, but the public may well not understand all of the terms, technical processes, etc. The third distinctive feature of environmental communication is the personal impact of the issues at stake. The air people breathe is, of course, a deeply personal concern. The fourth way is the

TABLE 4-1. LIKELY ADVERSE COMMENTS AND SUGGESTED RESPONSES

Comment	Potential Response (As Applicable)
1. There is little or no scientific documentation that an air toxics problem exists.	o Several EPA studies have shown that significant risks are associated with emissions of air toxics. o SARA Title III data show that large quantities of toxics are released into the atmosphere - 2.7 billion pounds annually from manufacturing plants alone. o Air toxics programs are designed to prevent public health problems from arising. o Citizen complaints and reported illnesses near industrial plants often can be traced to toxic air emissions.
2. Pollutant selection is arbitrary, as evidenced by the wide range in the number of pollutants regulated by States.	o Evidence is available to support regulation of specific compounds, including categorical findings, case-by-case determinations, extensive screening of specific compounds, emission inventories, and recommendations by other organizations (e.g., ACGIH, HIOSH< CAG, OSHA). o The list includes only those of local concern. o Federally regulated pollutants are exempt - thus there is no duplication. o The list is subject to revision and is a "living list." o Industries can demonstrate that emission of a particular pollutant from their plant does not pose a problem.

TABLE 4-1. LIKELY ADVERSE COMMENTS AND SUGGESTED RESPONSES (continued)

Comment	Potential Response (As Applicable)
3. Air toxics are already regulated under other programs.	o SARA Title III data show air toxics are not well controlled generally. o Criteria pollutant programs don't focus on toxics. o Many significant existing sources of air toxics are poorly controlled. o Some air toxics sources are not covered by criteria pollutant programs (e.g., POTW's, dry cleaners).
4. Program costs are unreasonable	o Demonstrated controls at a reasonable cost are available for most sources. o Sources can select among several control alternatives. o Case-by-case procedures are available to consider any unreasonable impacts. o Most existing sources would not be affected; most new sources require stringent controls anyway.

TABLE 4-1. LIKELY ADVERSE COMMENTS AND SUGGESTED RESPONSES (continued)

Comment	Potential Response (As Applicable)
5. Legal authority is inadequate	o General enabling authority has proven sufficient in most states. o The State Attorney General has concluded that adequate authority exists. o Federal law may soon require regulation of air toxics sources in any case.
6. Local industry will be disadvantaged and experience unacceptable delays by complicated reviews.	o Air toxics control is not the most important factor in competiveness on an international level (e.g., value of $). o All local industries would be subject to the same degree of control. o New source reviews requirements tends to equalize interstate effects for all new sources. o EPA resources are available to support implementation. o Some additional costs due in part to criteria pollutant programs.

involvement of relative risks. The distinction between voluntary and involuntary risks is frequently a factor in environmental communication.

4.2.3 Communicating Program Objectives

In the course of planning, developing and implementing an air toxics program, S/L's will need to communicate and coordinate with industry, the public, and a variety of public interest groups. The information needs of these groups differ, both in content and timing. Industry participation in the program development process is particularly crucial because the regulatory agency will not only need help in emissions data collection, monitoring and/or modeling efforts, but will need industry's cooperation to minimize opposition to the program. Typical industry communication objectives during the problem definition stage of the program development process are to:

- o inform owners/operators of potentially affected sources of the reasons for data collection,
- o explain how data will be used, and
- o explain how to generate the information requested (e.g., how to estimate emissions).

In some cases, industries are skeptical of data requests by S/L agencies. Reasons for resistance to supply information have included the attempt to gather too much information initially (e.g., requesting information about emissions for a very long list of pollutants), and the failure to adequately explain the reasons for data collection.

As the program is designed and implemented, various industry groups may have different information needs. It will then be necessary to:

- o document the impacts of the program,
- o explain the rationale for pollutants and sources covered and for the standards selected,

- o explain compliance requirements, including inspection, stack testing, monitoring, and reporting requirements, etc., and
- o negotiate in cases of potential violation.

The information needs of the public or public interest groups may be somewhat different from those of industry. Communication with these groups typically involves describing the proposed program, explaining general progress in controlling air toxics, explaining actions and seeking public opinion regarding a specific case. Communication with the public about a particular source is likely to be one of the most common communication needs after an agency's air toxics program is in place.

Another important consideration is presenting the impacts of the proposed regulation. These impacts may include economic impacts to industry as well as health impacts to the general public. Such information should be presented as soon as possible, with emphasis on any reservations about reliability. Impacts should be neither exaggerated nor minimized, and worst-case estimates should be identified as such. Maryland has found that presenting impacts information to the public about health issues is their most effective communication approach. In most cases Maryland has been able to state that predicted ambient concentrations are below levels considered protective. Keeping information simple and straightforward is beneficial. It is also useful to anticipate questions the public will ask and to prepare general responses. Maryland stresses that it is very important for the communicators to understand that people are truly concerned about their own health and that of their children.

In summary, throughout the air toxics program development process, the agency will need to work closely with all interested groups in order to:

- o explain problem definition measures underway and the reason air toxics control is being investigated,
- o solicit program design assistance, and most importantly,
- o achieve support from and consensus among various interests that will help in achieving compliance with proposed control measures.

4.2.4 Meeting Your Communication Objectives

S/L agencies have used a variety of communication techniques to convey the objectives of their program. These include such commonly used techniques as committees, public hearings, public and industry seminars, and newsletters.

Committees. One of the most successful and widely used techniques is forming a committee or task force. According to several agencies who have sought committee advice and comment, there are two keys to successful involvement of outside groups. First, the representatives chosen to speak for a group must have the authority to speak on the group's behalf. Second, each representative must take information back to their respective group to keep that group well informed. Also helpful, if possible is to have the committee or task force complete its work during the same administration to minimize the turnover in committee or task force membership. Having to educate new members is time-consuming and can undermine momentum. In selecting committee members, it may be helpful to have the Governor, or other leading official, request directly that certain groups or individuals participate on the committee. This may ensure fair representation of all groups.

Michigan's air board appointed a Special Advisory Committee to determine if a problem existed with toxic emissions, and if so, how such emissions should be controlled. Several disciplines and interests, including industry, were represented on the committee and were involved throughout program development. All meetings were open to the public and invitations were sent to many groups and individuals to attend each meeting. The Air Quality Division staff attributed a large measure of the program's success to such public participation.

Philadelphia's Health Commissioner appointed an ad hoc advisory committee to advise the air agency in setting ambient guidelines. Industry, academia, government, and the community were all represented on this ten-member committee of experts in the fields of toxicology, industrial hygiene, and occupational medicine. At the beginning of the guideline development process, each member assumed responsibility for researching and evaluating available information on several of the 99 substances

proposed for regulation. Final guidelines were set by a consensus of the group. Philadelphia's Air Management Services (AMS) noted that it was sometimes difficult for the committee to reach agreement on a particular guideline or procedure, but added that use of the ad hoc advisory committee composed of different interest groups was important. The AMS said it was important that all members of the committee were willing to work toward acceptable solutions. Connecticut has also had experience in forming a working group to assist in program planning and development. The Connecticut groups are described in the case example highlighted on the following pages.

At EPA's air toxics workshops, staff members from Connecticut's Department of Environmental Protection (DEP) Air Compliance Section described the various groups involved in that agency's decision-making process in program planning and development. In addition to the Department staff, nine other groups are involved:

- the State Implementation Plan Revision Advisory Committee (SIPRAC), a permanent steering committee [not formed specifically for the hazardous air pollutant (HAP) program] of approximately 50 members representing a broad range of interests;

- the HAP Study Subcommittee, a seven-member SIPRAC subcommittee formed for discussions of detailed issues, consisting of two attorneys (one representing business and industry and one representing an environmental advocacy group), an industrial hygienist, a State toxicologist, an industry engineer whose company does not have manufacturing facilities in Connecticut, and two DEP engineers [The HAP subcommittee discussed and resolved several issues and presented a final version of the program description to the full SIPRAC];

- specific interest groups, such as the Connecticut Business and Industry Association, who gave "reasonable and prudent" recommendations on several issues such as the setting of acceptable ambient levels;

- environmental activists including the Environmental Caucus, an umbrella organization comprising members of several groups [These groups were instrumental in the reversal of the policy to allow dispersion as a means of compliance];

- the State's Department of Health Services (DHS), who had had experience in working with an advisory board and developing health standards for drinking water [Through a memorandum of understanding,

the two departments agreed upon a procedure through which DHS would provide expertise to DEP];

- o U.S. EPA Regional office staff, who reviewed the program descriptions;
- o the State Attorney General's office, who gave legal advice;
- o the general public, who commented in public hearings after the regulations were drafted and reviewed by SIPRAC; and
- o the State General Assembly, who mandated a study of the feasibility of an air toxics program and passed the regulations for the HAP program.

Public Meetings and Public Hearings. Some States, such as Maryland, are required by law to give citizens an opportunity to request a public hearing when certain sources have applied for a construction permit. In Maryland, of the permit applications for which public hearings may be requested, about half result in a hearing. Maryland's Air Management Administration recognized a need to discuss the permit applications and air pollution issues with the public in a more casual atmosphere than offered by a public hearing. Thus, a less formal public meeting is usually held followed by a formal public hearing.

In explaining their experiences for the report National Air Toxics Information Clearinghouse: Case Studies in Risk Communication (EPA-450/5-88-003), Maryland noted that in a few instances, a brief discussion of the source and permit application was sufficient to allay public concerns, and that little opposition had been expressed at the public hearing even though, in most cases, both the public meetings and the public hearings have been well attended. The public meetings helped focus attention on air pollution control issues. It was Maryland's experience that some people wanted to discuss issues related to the facility over which the air management staff has no jurisdiction (e.g., traffic problems).

In preparing for public meetings and hearings, Maryland judges the level of detail needed for each meeting, based on their familiarity with interested citizens' groups, and business and industry representatives likely to be present. If necessary, the Department's Assistant Secretary for Toxics, Environmental Science and Health can be called on to describe risks.

In Maryland, the opportunity to request a public hearing is announced in newspapers. Citizens' groups in the affected area are contacted, but the responsibility for becoming aware of potential hearings lies with the interested parties. Maryland feels that the public is pleased that toxic emissions have been evaluated and that efforts have been made to solve any problems. Simple, straightforward verbal and written presentations are the most effective, with more detailed material available on request. They have distributed fact sheets as people enter the public meetings and hearings. The fact sheets describe, in laymen's terms, the facility or plant, the products it manufactures, the processes it uses, pollutants that will be emitted, modeling results showing the concentrations predicted for each of the pollutants, and an acceptable ambient level for each pollutant.

Special Industry Meetings or Seminars. Some agencies have targeted certain industries common in their area for special meetings or seminars aimed at the toxics issues of the particular industry. For instance, North Carolina and Virginia have both worked with the furniture manufacturing industry. Through EPA's Control Technology Center, Virginia investigated and met with furniture manufacturers on the control of formaldehyde emissions. This same type of meeting with a special interest group has also been used with citizen and environmental groups, as well as with groups of people who are interested in emissions from a particular source.

Similarly, Maryland held discussions on proposed regulations with representatives of the Baltimore Chamber of Commerce, the Chemical Industry Council, and individual businesses. These meetings were held to ensure that effected industries understood how the proposed regulations would apply to their facilities and to give them an opportunity to explain any specific problems they foresaw in implementing the regulations.

Newsletters. Some agencies publish newsletters to inform all concerned groups on issues the agencies are addressing. Newsletters are prepared for a wide audience with varied interests and concerns rather targeted at only one interest group. Wisconsin's Department of Natural Resources, Bureau of Air Management, publishes

a free quarterly newsletter called "Air Matters." Similarly, the Northeast States for Coordinated Air Use Management (NESCAUM) also publishes a quarterly newsletter called "Northeast AIReport." The purposes of this newsletter are to improve the exchange of information among the eight NESCAUM States and to share the northeast region's concerns, proposals, and programs with air quality officials and other interested parties throughout the country.

4.2.5 Communicating About Risks

As S/L agencies design and implement air toxics control requirements, risk communication, or explanation of the health risks posed by toxic emissions, will be required. In 1987, EPA's Office of Policy, Planning, and Evaluation established the Risk Communication Program (RCP). The goal of the RCP is to provide technical assistance in communicating environmental risks to the public. In addition to assisting EPA staff with their risk communication efforts, the RCP sponsors its own projects to advance the state-of-the-art of environmental risk communication. Projects sponsored by the RCP are selected after receiving input from the Risk Communication Work Group, comprised of representatives appointed by each EPA Office.

Currently, the RCP is concentrating on risk communication training, radon, and Title III of the Superfund Amendments Reauthorization Act (SARA Title III). Risk communication training has been selected as a priority by the RCP in order to expedite the transfer of risk communication skills to EPA and S/L agency staff. SARA Title III is an area of emphasis for the RCP because of its potential importance at the community level. Radon risk communication is an area of concentration by the RCP because of the large need for it perceived by the Office of Radiation Programs. Several projects form an integrated examination of how to develop an effective radon risk communication program.

Also, an information hotline is operated by the staff of EPA's RCP. The hotline gives program offices, regions, and S/L agencies quick access to research results, provides the names of experts, and provides review of proposals and draft materials.

For comments or questions about the RCP, contact Derry Allen at (202) 382-2747, or Ann Fisher at (202) 382-5500. The RCP hotline number is (202) 382-5606.

Two pressing reasons exist for improving an agency's ability to communicate with the public about risks. The first is that the most serious remaining environmental problems are not the most obvious ones. Because the public ultimately determines the regulatory agenda, it is important to put the risks in context for them. Second, many current environmental hazards are beyond the traditional tools of regulation and require individuals to take action themselves (e.g., radon levels in houses).

The EPA shares these concerns and has identified four steps of risk communication through its RCP. These steps, applicable to all communication objectives mentioned in this section are:

Step 1. Determine the purpose and audience of the communication (this will guide the factual content of the message).

Step 2. Develop strategies for getting the message across (this includes determining which groups and media would provide the best mechanism for reaching the audience and establishing the credibility of the information source).

Step 3. Implement the strategies,

Step 4. Evaluate the effectiveness of the risk communication effort.

The EPA's Office of Policy Analysis has published a brochure titled, "Seven Cardinal Rules of Risk Communication". While aimed at making and explaining decisions that involve risk to the public, these guidelines give sound advice to agencies developing and implementing an air toxics program.

To obtain the brochure "Seven Cardinal Rules of Risk Communication", contact the Risk Communication Program at (202)382-5606.

Case Studies in Risk Communication (EPA-450/5-88-003) published by NATICH, is a further source of risk communication aid. This document profiles three case studies, and includes the agencies' assessments of what was done well, what could have been done better, and what advice they would offer to other agencies undertaking a risk communication program. The three agencies emphasized that it was very important to be open and straightforward with all interested parties, to be willing to answer questions and investigate all issues.

Summary advice for other agencies includes putting risk estimates into perspective for the public, thoroughly evaluating the facility in question, anticipating the public's questions in order to present technical information clearly, and being sure of the facts and confident of explanations of agency policy before going to the public.

4.2.6 Working With the Press

When addressing air toxics issues (whether the initial adoption of a program or a particular permit application) agencies will undoubtedly have contact with the press. How the press portrays the issue may greatly affect the public perception or reaction. Agencies may have news conferences to formally pass information to local newspapers, and to television and radio stations. In addition to large news conferences, individual or small group briefings with reporters may be useful. Such small group sessions are more relaxed, allowing the agency to elaborate on complex technical concepts.

Of major interest to the press recently are reports generated by SARA Title III of toxic chemical releases. These reports of millions of pounds of toxic air contaminates released annually have generated considerable public support for air toxics controls. S/L agencies should be familiar with SARA Title III and be prepared

to respond to press and public inquiries about efforts to control these releases. Agencies can expect continued press attention on Title III data and its implications for public health.

From SARA Title III coverage and other experiences, agencies have learned some important lessons. In dealing with a source of inorganic arsenic emissions in Tacoma, Washington, EPA and the Puget Sound Air Pollution Control Agency (APCA) had almost daily contact with the press. Both agencies felt they were able to build a good relationship with reporters. As described in Case Studies in Risk Communication, the Puget Sound APCA felt the agency had learned some important techniques for dealing with the press. They found that the main concern among the newspapers concerning the story was to be the first to publish a particular item, regardless of accuracy. For this reason, Puget Sound APCA learned the importance of communicating facts to the press understandably and accurately. The agency found that the press was interested in covering events rather than explaining the process to be used in decision-making, or explaining a control alternative. When the agency staff and reporters came to understand each others' concerns, they were able to help each other and work well together.

4.3 COORDINATING WITH OTHER REGULATORY PROGRAMS

This subsection describes how State Implementation Plans (SIPs) and other toxics-related programs can complement an air toxics control program. Existing regulatory programs can provide a wealth of data useful to air toxics control programs. For example, if the air agency is trying to quantify evaporative toxic emissions (e.g., waste solvents) from settling tanks, the agency's waste management staff may be able to provide data on tonnages of waste present, composition, tank sizes, and tank operating characteristics that would facilitate the emissions calculations. The waste management staff may routinely require reports that provide data needed for air toxics emissions evaluations and control. Planning air toxics programs in conjunction with other programs conserves S/L resources and avoids the pitfall of duplicating work already done.

4.3.1 Recognizing the Commonality of Different Regulatory Programs

Seemingly different regulatory programs share a common environmental goal. Each is charged with protecting public health. State criteria air pollutant programs, for example, limit criteria emissions to levels that will not exceed health-based national ambient air quality standards (NAAQS). Air toxics programs aim to lower toxic emissions to levels whereby public health risks are minimized or kept below levels deemed to be unacceptable.

Coordination with existing criteria air pollutant control programs is a prerequisite for any successful air toxics program. In addition, other existing environmental and health protection programs also provide benefits to an air toxics program even though they may not be specifically aimed at controlling air emissions. Some of the more prominent programs include:

- Superfund Amendments and Reauthorization Act (SARA)
- Resource Conservation and Recovery Act (RCRA),
- Occupational Safety and Health Administration (OSHA), and the
- Clean Water Act (CWA).

Programs such as these cover a diverse set of topics and provide multimedia toxics control opportunities. Focused primarily on hazardous waste treatment, storage, and disposal, RCRA has components that are applicable to air toxics. Activities under SARA Title III cover all media and have direct implications for air toxics control. Although OSHA does not address air toxics releases to ambient air, it does identify industrial and commercial activities that produce airborne toxics of concern. The CWA program can serve as a good source of information to evaluate potential air toxics emission sources from the standpoint of identifying chemicals in a process

and its wastewaters. More detailed information on the coordination possibilities between these programs and a developing air toxics control program is given in Subsection 4.3.3.

Air toxics programs can benefit from coordination with these toxic-related programs. As discussed in Section 2.0, a S/L agency's initial goal is usually to determine the sources emitting pollutants deemed to pose toxic concerns. Each of the four companion programs listed above can provide useful information on sources known to be handling/producing chemicals that may be viewed by the air agency as a toxic of concern. Some programs may have developed emissions information that could be used to help bound the problem. The air agency can investigate the potential for air emissions. In addition, the air toxics program may benefit from requirements imposed by these companion programs (e.g., a source is prohibited from putting waste solvents in an open-air lagoon). As the S/L program evolves, reporting requirements of other programs may have enforcement and source monitoring benefits for the air toxics control effort.

As a result of these commonalities, S/L agencies should take advantage of every opportunity to use information developed by other programs and to optimize air toxics control via co-control efforts. Recognizing and taking advantage of these opportunities will save agency time, money, and waste from duplicated efforts.

4.3.2 Coordinating with State Implementation Plans (SIPs)

4.3.2.1 SIP Activities and Their Relationship to Air Toxics

Although the primary goals of SIPs are attaining and maintaining the National Ambient Air Quality Standards (NAAQS) for criteria air pollutants, an important secondary goal can be enhancing the control of toxic air pollutants. Reductions in criteria pollutants through SIP activities, in addition to Federal regulatory efforts focused on criteria pollutant control, have been shown to produce substantial reductions in specific air toxics that exist predominantly as a form of either PM or VOCs.

The air toxics problem overlaps with PM and VOC problems in two ways. First, many areas that are nonattainment for particulate matter nominally 10 micrometers or less (PM_{10}) and virtually all ozone nonattainment areas to be addressed in upcoming SIP revisions involve large urban areas that are believed to have air toxics problems. Second, the vast majority of toxic substances belong to the general categories of PM and VOCs.

Major SIP changes are under development in response to a revision in the PM NAAQS and the passing of the attainment date for the ozone NAAQS. Additional controls designed to reduce criteria pollutants can be justified, in part, by their simultaneous payoff in air toxics control. Moreover, these SIP control efforts, properly designed, can do much more to reduce the air toxics concerns associated with increased cancer incidence and risks to the maximum exposed individual.

In 1987, as part of the Clean Air Act's requirement that EPA periodically review and, if appropriate, revise the NAAQS, EPA revised the primary and secondary NAAQS for total suspended particulates (TSP) to apply to PM_{10}. In the case of PM_{10}, agencies were to submit a plan by August 1988. All areas within a State are classified as Group 1, II, or III, based on the probability of attainment of the new PM_{10} standards.

In May 1988, EPA issued "SIP calls" for 66 areas that failed to meet the December 31, 1987, Act deadline for attainment of the ozone NAAQS. Revised ozone SIPs will be developed in two phases. The first phase will focus on upgrading emission inventories and correcting loopholes and deficiencies in existing SIP's. The second phase, and its timing, will be contingent on EPA's final post-1987 Policy (or Clean Air Act amendments). Regardless of the ultimate schedule for revising existing ozone SIP's, it is clear that many State and local agencies will need to consider additional VOC control measures in the coming months.

Both the ozone and PM_{10} SIP actions offer several opportunities for enhancing State and local air toxics programs. First, S/L agencies are encouraged to develop an air toxics component for their ozone and PM_{10} SIPs. In this way, air toxics and SIP goals can be explicitly addressed simultaneously in the context of SIP themselves.

One benefit of this integrated approach could be the enhanced acceptability of SIP control measures that can be credited with both criteria pollutant and air toxics reductions. In addition, SIP control measures that may be somewhat marginal from a purely VOC perspective may be regarded more highly if they are demonstrated as having significant health risk reduction benefits.

In short, significant cost saving opportunities appear possible for S/L agencies by promoting better coordination with air toxics programs in the development of SIPs. Many of the same point and area sources are likely to be affected by both programs.

4.3.2.2 Coordination Opportunities

Updating and upgrading emissions inventories for PM_{10} and/or ozone SIP purposes is a good opportunity for S/L's to enhance the utility of these inventories for air toxics applications. Several suggestions follow on how to optimize inventory and air monitoring efforts, so that the data can be used for multiple purposes. If implemented, these ideas are likely to reduce total resource requirements compared to carrying out separate programs to accomplish toxic and criteria pollutant goals.

1. Source Category Coverage.

It is usually beneficial to inventory the sources and/or use the results of monitoring programs to identify specific air toxics of concern. The S/L agency is already aware of major point sources included in criteria pollutant inventories. When updating these inventories for SIP purposes, the agency can also review these sources to determine if they could be sources of air toxics of concern. The EPA's Air Emissions Species Manual (EPA-450/2-88-003a and b) and the Toxic Air Pollutant Source Crosswalk (EPA-450/4-87-023a) are good references to use to identify potentially toxic constituents of particulate matter (PM) or volatile organic compounds (VOC) emissions, and the sources that emit them. The Crosswalk associates emitting source categories with specific pollutants and as such is an indication of the potential for a given substance to be emitted by a particular source category. The Air

Emissions Species Manual is a two-volume document that contains speciation factors for PM and VOC that can be used to estimate the specific compounds that comprise PM and VOC emissions.

Many of the toxics-emitting sources have typically been included in past emissions inventories for PM_{10} or VOC (ozone). Some newly-implicated source categories such as treatment, storage, and disposal facilities (TSDFs), leaking underground storage tanks, and publicly-owned treatment works (POTW) are important sources of toxic emissions, but have not typically been included in past criteria pollutant emission inventories. Including these sources in updates to the inventory should be required because opportunities for coordination certainly exist with water, hazardous waste, and solid waste program offices.

2. Pollutant Coverage.

Air toxics may be in the form of PM, volatiles, or semivolatiles. Metals and certain polycyclic organics [e.g., benzo-a-pyrene (B(a)P)] will likely exist in the ambient air in particulate form, almost always concentrated in the smaller size ranges ($\leq$ 10 micrometers). The VOCs of concern for ozone formation also are usually composed of multiple chemicals, many of which may be considered toxic.

Ideally, the VOC and PM_{10} inventory should be completely speciated for each toxic of concern. Where this is not reasonable, a smaller list of compounds of interest can be developed by first scrutinizing the applicable point sources. Using data on hand such as permit files, tests/analyses, the Air Emissions Species Manual, and "right-to-know" information from sources as a result of SARA Title III requirements, point sources can be evaluated with respect to their emissions of air toxics of potential concern.

Area sources, such as motor vehicles and wood combustion, have been shown to be a major concern in many areas. This concern can usually be traced to a number of pollutants which include formaldehyde, benzene, 1,3-butadiene, chromium, B(a)P, and others.

3. Monitoring Considerations in SIPs for Ozone and PM_{10}.

Ambient monitoring is usually an important aspect of preparation and execution of a SIP. The ambient monitoring program for PM_{10} and ozone will result in a collection of particulate samples and some measurement of the nonmethane organic compounds. While these results are of little use directly in the assessment of air toxics "potential," some supplementary analyses can be useful. The particulate samples can be inexpensively analyzed for total metals (e.g., arsenic, beryllium, cadmium, chromium), and it can be a reasonably minor effort to supplement VOC programs by speciating total VOC samples using EPA-supported programs. The EPA supports a sampling program by which S/L's agencies can obtain ambient nonmethane organic compound/nitrogen oxides ($NMOC/NO_x$) ratio data for 6 to 9 a.m. summer weekday situations. Through this program, S/L agencies provide contract funding, sampling sites, and personnel. The EPA provides sampling equipment, transportation, and contractual analytical capabilities. A number of the VOC samples collected under the program in past years have been analyzed for organic species. This support mechanism continues to be available to S/L agencies that want to obtain both VOC and air toxics data for a preliminary look at what air toxics might exist in the ambient air.

Arrangements can also be made for analysis of particulate filters for metals and B(a)P and for sampling and analysis of cartridges for aldehydes, ketones, and other oxygenates. The EPA will facilitate S/L efforts to evaluate these samples. A broader but similar program also exists to provide for sample and analyze of 24-hour samples taken every 12th day throughout the year, if desired. However, this program is almost exclusively in the interest of air toxics screening and does not contribute greatly to PM_{10} or ozone SIP development. The S/L agencies should keep this information in mind when defining the nature and extent to which their ambient monitoring program for criteria pollutants is augmented and/or sensitized to air toxics concerns.

For more information on urban air toxics monitoring, contact EPA's Monitoring and Reports Branch at (919)541-5652.

4.3.2.3 Co-Control Opportunities

Once specific air toxics concerns have been identified, to the extent time and resources allow, S/L agencies are encouraged to develop and implement appropriate co-control measures. In urban areas these measures might emphasize the control of specific source categories and pollutants, and particularly area sources. Outside urban areas the focus of co-control might be more on the control of specific large point sources. Several types of co-control measures to address this range of air toxics concerns are discussed below.

Within existing legislative authorities, ongoing EPA regulatory efforts for criteria and noncriteria pollutants will contribute toward the future reduction of air toxics levels. Continued implementation of existing S/L and Federal requirements will also reduce PM and VOC emissions which are likely to contribute to the current air toxics problem. Despite these efforts, inadequate progress on the air toxics problem will, in many cases, lead some S/L agencies to adopt significant additional mitigation measures for toxics. Any co-control measures adopted by a S/L agency for mitigating PM and VOC air toxics for any given area will depend on such factors as the number and type of sources, the types and quantities of pollutants emitted, ambient concentrations of pollutants, and the costs of control (as well as local political, economic, and legal considerations). The S/L agency will need to make these decisions based on their own individual policies regarding acceptable ambient levels and risk management, as well as what otherwise will happen under Federal programs.

Following is a discussion of several candidate co-control measures for consideration by S/L agencies. These measures represent a starting point for the consideration of approaches to mitigating risks from exposure to air toxics. Where a measure might involve a source category which is under consideration for a national

measure might involve a source category which is under consideration for a national standard, coordination with EPA is recommended to understand the most recent information regarding possible overlap prior to the adoption of this measure.

For the most part, the candidate co-control measures described below do not include new or necessarily innovative ideas. The list does, however, identify the mitigation measures that appear to offer the best prospect for reducing the cancer and noncancer risks of exposure to PM and VOC air toxics, particularly in urban settings. As the understanding of the air toxics problem improves, new approaches may emerge. Additional ideas for co-control should come from future field and research experience. For example, the control of condensible particulate matter (now implemented by several S/L agencies and being researched by EPA) may well accomplish co-control objectives for certain source categories.

1. More Intense Audit and Enforcement of Existing SIP Requirements.

Analyses show that considerable indirect control of air toxics can be achieved through intensified efforts to enforce existing SIP requirements. Aggressive auditing and enforcement of regulations for VOC and PM sources, which also emit toxic pollutants, can be a cost-effective means of minimizing emissions of air toxics from new and existing sources. An intensified enforcement effort aimed at sources of air toxics could include:

(1) compliance audits of selected high priority sources (e.g., those emitting significant amounts of high priority pollutants, sources with a history of poor compliance, etc.);

(2) increasing the number of enforcement source inspections;

(3) step-up of enforcement actions against noncomplying sources which emit air toxics;

(4) evaluation of facilities most likely to experience process upsets or control equipment malfunctions;

(5) strengthened source monitoring requirements;

(6) **greater use of opacity monitoring as an enforcement tool; and**

(7) **expanded coverage of ambiguous VOC regulations to sources not previously judged to be covered by those regulations.**

2. Selection of Additional PM and VOC SIP Co-Control Measures.

Revision of existing PM and VOC SIP's will be necessary in many areas to attain and/or maintain the PM_{10} and ozone NAAQS. Control strategies that offer significant air toxics benefits and, at the same time, satisfy PM_{10} or ozone plans should be given serious consideration over those that do not enhance air toxics control. Also, there may be measures that are marginal from an ozone or PM_{10} perspective, but which can be further supported on the basis of the payoff of additional toxics control. For example, it has been shown that VOC can degrade in the atmosphere to form formaldehyde; therefore, any additional control of VOC from stationary or mobile sources could result in lower ambient levels of formaldehyde.

3. Adoption of Control Measures in SIP's for Sources/Pollutants Not Included.

Consideration should be given to identifying and adopting control measures for sources or pollutants not currently covered under SIPs. Numerous small sources which are potential emitters of toxics are often exempt from S/L permit requirements (e.g., degreasers or miscellaneous metal or plastic coating operations). Also, sources not presently required to apply Reasonably Available Control Technology (RACT) could be controlled to RACT levels if they are sources of air toxics (e.g., spray painting bridges with chromate paints). Thirdly, consideration should be given to the control of VOCs which could be exempt, under current regulations, because of negligible reactivity (e.g., small furniture refinishing businesses using methylene chloride as a paint stripper). Finally, some sources and/or source-related operations

are exempted within SIPs (such as peaking power units and malfunctions), and these exemptions should be reexamined in light of their toxics implications. Control of each of these sources may not have been justifiable previously on the basis of criteria pollutants control, but may be worthy of consideration under a co-control program to address air toxics.

4. Nontraditional Sources and Control Strategies.

An examination of the urban air toxics problem reveals that, in many instances, nontraditional sources of air pollution may be major contributors to the problem. In turn, this conclusion suggests that solving the problem may call for the adoption of some less traditional control strategies.

Acting to increase public awareness can be a cost-effective means of minimizing PM and VOC and toxic emissions from area sources such as woodstoves and solvent use and disposal. Woodstove emissions are a major source of toxic air contaminants and PM_{10} in many urban areas. High concentrations of polycyclic organic matter (POM) emissions resulting from woodstove and fireplace emissions have been shown to result in significant seasonal cancer risks in some areas. Also, potential nonattainment areas for PM_{10} may need to achieve reductions in wood smoke emissions to demonstrate attainment of the PM_{10} NAAQS.

A cost-effective means of minimizing risks from wood smoke may be education of woodstove owners about proper operation of woodstoves. Such a public education effort has been implemented in some areas, and EPA is considering a public education campaign in conjunction with the NSPS for woodstoves. Using materials presently available from EPA (e.g., woodstove pamphlet included in the back of this document), S/L agencies could, for example, advise woodstove owners of ways to reduce woodstove emissions (e.g., small, hot fires; seasoned wood; appropriate size stoves operated at efficient levels; catalytic combustors) or eliminate woodstove use at certain times, such as during inversions.

Another area where public education can play a role in minimizing air toxics and VOC emissions is in the handling and disposal of solvents. A number of toxic

organics (such as trichloroethylene, chlorobenzene, and nitrobenzene) escape into the atmosphere in the form of fugitive emissions as a result of improper solvents disposal by individuals and small businesses. Because the use of solvents is widespread in urban areas, improper handling and disposal practices can be a significant contributor to air toxics and VOC loadings. A reduction in such VOC emissions may help areas that are currently nonattainment for ozone.

State and local agencies may also want to consider a program to identify small businesses that commonly use solvents and educate them, as well as the general public, about good solvent handling and disposal practices. In some areas, local solvent recycling programs and recycling cooperatives have been initiated to address this need. The effectiveness of such measures will depend on the amount of effort and resources applied, the attitudes of the public and small business community concerning air pollution and environmental protection, and the expense and inconvenience of recommended disposal methods versus traditional methods. An effective public education campaign about solvent usage and disposal has the potential to reduce risks from air toxics exposure for a relatively small investment of public and private resources.

Because health risks to the public arise from a variety of sources and through a multitude of pathways and media, a more integrated approach to controlling urban air toxics may be warranted. For example, the influents and effluents of public wastewater treatment plants are indicated as a sizeable source of air toxics, especially those that receive discharges from chemical plants. Rather than directly controlling emissions at the wastewater treatment plan itself, pollution prevention measures such as industrial pretreatment programs aimed at reducing the discharge of organics into public sewer systems, and the subsequent intermedia transfer of organics to the atmosphere, may be more appropriate. Such an integrated, multimedia approach can target the pollutants and sources posing the greatest overall risks to the public, regardless of the particular environmental medium involved. Good communication and coordination between Federal, State and local agencies is crucial to the success of an integrated, multimedia approach such as this.

4.3.3 Coordinating with Other Toxics-Related Programs

Coordination opportunities in the establishment of air toxics programs exist with several other program areas in addition to SIP programs for PM and VOC. The most prevalent programs offering air toxics benefits through coordination are the SARA Title III program, the RCRA/CERCLA program, OSHA programs, and the Clean Water Act program. The generic opportunities for coordination within each of these programs are described in the following sections, with examples given where specific States have successfully implemented such coordination. Table 4-2 provides contacts for information related to other toxics-related programs.

4.3.3.1 SARA Title III Regulations

The SARA Title III provisions, also known as the "Emergency Planning and Community Right-to-Know Act," can provide a great deal of information that is pertinent to the air toxics control program. Successfully coordinating the data available from SARA Title III with the information needs for an air toxics program can lower the resources otherwise required for the air toxics initiative.

Several portions of the SARA Title III program have relevance to an air toxics initiative. The sections that can provide the most data and have the greatest impacts on air toxics program development are Sections 304, 311, 312, and 313.

The foundation of the SARA program is to provide EPA, S/L agencies, and the public with information regarding the storage, use, manufacture, or release of certain chemicals designated as hazardous. The EPA has established a list of hazardous chemicals for which reporting must be done. The list currently numbers over 400 chemicals and is expected to grow over time. The 400+ hazardous chemicals are characterized as being toxic and/or extremely hazardous, which roughly

TABLE 4-2. TOXICS - RELATED PROGRAMS INFORMATION

Source	Clients	Format	Costs	Information Available	Contact
RCRA/ CERCLA Hotline	Federal, State, & Local agencies; regulatees, those involved in cleanup and the public		none	Assistance in understanding EPA regs policy and technical aspects relevant to RCRA/CERCLA (Superfund) and the Underground Storage Tank (UST) programs	800-424-9346 or (202)382-3000 or (FTS)382-3000
SARA III Hotline	Manufacturers; general public, government agencies		none	Answers to SARA Title III questions regarding emergency response planning; emergency notification; community right-to-know; and toxic chemical release reporting	800-535-0202
SARA III Database	Manufacturers; general public, government agencies		Billed directly	Data listing of Toxic Release Inventory database available through National Library of Medicine (TOXNET)	Account info: (301)496-6531
	S/L agencies			Database available through National Computer Center and NATICH	Contact: Regional TRI Account Manager or NATICH Staff (919)541-0850
TSCA Assistance Information Service	Chemical industry; labor and trade organizations; environmental groups; the public		none	Information on TSCA regs, requests for publications re: management of toxic substances and referrals to appropriate EPA personnel	(202)554-1404

corresponds to chronic and/or acute health hazards, respectively.

Reporting under the SARA Title III provisions is due annually by July 1, beginning in 1988. The EPA is currently evaluating responses received, performing quality assurance checks, and developing a computerized data base of information that is accessible by S/Ls through the National Computer Center in Research Triangle Park, North Carolina. In addition, States are also receiving the SARA Title III submittals and data compilations. In some cases, private groups such as the Natural Resources Defense Council, the American Lung Association, and the Sierra Club have analyzed and summarized State data. Such analyses will likely be available to S/L agencies and could provide information that could save agency resources for toxics program development. The SARA Title III data are also available through the National Library of Medicine and the NATICH database (see Table 4-2.)

Perhaps the most important part of SARA Title III from an air toxics program standpoint is Section 313. This section pertains to uniform toxic chemical release reporting that must be done by industrial facilities meeting certain criteria. The reports are filed with EPA and State authorities. The Section 313 requirements apply to facilities that:

- o employ 10 or more persons full time,
- o are in Standard Industrial Classification (SIC) Codes 20 through 39 (as in effect on July 1, 1985), and
- o in the calendar year for which a release form is required, manufactured, processed, or otherwise used a toxic chemical on the list described below in amounts greater than those specified.

The toxic chemicals subject to the release reporting requirements are given in the EPA publication "Toxic Chemical Release Inventory Reporting Form R (EPA-560/4-88-005). The EPA is continually evaluating and updating this list such that chemicals may have been added or deleted since the publication of this report. The final determination on whether a chemical release must be reported is based on established reporting thresholds. For toxic chemical use at a facility, all uses of

10,000 pounds per year or greater require Section 313 release reports. For toxic chemical manufacture or processing, the release reporting thresholds are 75,000 pounds per year for all forms due on or before July 1, 1988, 50,000 pounds per year for forms due on or before July 1, 1989, and 25,000 pounds per year for all forms due on or before July 1, 1990 and thereafter.

The Section 313 chemical release form (Form R) provides the name, location, and primary business activities of a subject facility. For each listed toxic chemical emitted by the facility, the following data must be provided:

- Whether the toxic chemical at the facility is manufactured, processed, or otherwise used, and the general category or categories of use of the chemical.
- An estimate of the maximum amounts, in ranges, of the toxic chemical present at the facility at any time during the preceding calendar year.
- For each waste stream, the waste treatment or disposal methods used, and an estimate of the treatment efficiency typically achieved by such methods for that waste stream.
- The annual quantity of the toxic chemical entering each environmental medium.

The usefulness of the Section 313 data in the problem definition and program implementation phases of an air toxics control program are readily apparent. Not only are potentially significant sources identified by the pollutants emitted, but emission quantities are also provided. Indications of the potential for improvements in control device use and efficiency are provided. The data can also be used as a parallel enforcement tracking measure. Similarly, Section 313 reports can be used to potentially measure the effectiveness and progress of the air toxics control program in reducing overall airborne emissions.

4.3.3.2 RCRA/CERCLA Regulations

The Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Responsibility, Compensation, and Liability Act (CERCLA) are two Federal control programs that can provide information useful to air toxics control efforts. Both RCRA and CERCLA were originally designed as control programs for hazardous wastes, particularly hazardous wastes that were being disposed of by land treatment means (e.g., landfills, deep well injection, etc.). However, through the Hazardous and Solid Waste Amendments of 1984 (HSWA) and SARA, both control programs have expanded their scope in addressing hazardous waste management and disposal. Toxic air emissions from hazardous waste incinerators are covered. Multiple toxics emission points from comprehensive hazardous waste treatment, storage, and disposal facilities (TSDFs) have been investigated for regulation jointly by EPA's air and hazardous waste offices. Regulations limiting volatile organics releases have been proposed (52 FR 3748) for TSDFs. Potential toxic air emissions occurring during site clean-up operations are being estimated and potential risks determined under the CERCLA Superfund program. A significant amount of information may be available from these programs that could aid S/L agencies in the problem definition and implementation phases of an air toxics control program.

One of the primary benefits of the RCRA/CERCLA programs is to help identify what sources handle substances deemed to be toxic. The RCRA regulations (40 CFR, Part 261, Subpart D) contain six categories used to classify chemical wastes. These six are toxic, acutely hazardous, EP toxic (Extraction procedure-Method 1310), reactive, corrosive, and ignitable. Though the lists are dynamic and continually under review, the toxic and acutely hazardous lists combined currently include over 600 substances. Sources handling RCRA-listed wastes must conform with specified treatment, disposal, and reporting requirements. The data produced by these reporting requirements would be useful in denoting facilities handling substances of concern and flagging potential air toxics emitters. Information may also be provided that could be used to calculate emission estimates.

Other work done by hazardous waste agencies may provide similar types of information that would be beneficial to air agencies. Inventories of TSDFs have been prepared by EPA and States for various purposes including the development of regulations for TSDF air emissions. These inventories can provide much useful information for problem definition purposes. Similarly, permit information, namely RCRA Part B permits, can provide useful data on what industrial sources (not just TSDFs) handle RCRA-listed wastes, and therefore may be sources of air toxics. In most cases, Part B permits would provide sufficient data to calculate toxics emission estimates.

The Superfund National Priorities List (NPL) program can also provide a data on of air toxics emissions from hazardous waste clean-up sites. The provides Hazards Ranking System (HRS) used for NPL listing data on sites that may present significant risks until clean up. It does not provide much data on currently active TSDFs as air toxics sources. Through the HRS, Superfund sites are evaluated and ranked according to their overall health risk potential. Several hundred chemicals are listed by CERCLA (40 CFR Part 302) as being hazardous and are evaluated by the system. The overall evaluation includes multimedia exposure routes and exposures from the site during clean-up operations. The rankings are used to prioritize clean up initiation among sites nationwide. The HRS provides a substantial amount of information that effectively defines the extent of the health risk at a particular site. This information can be useful to a S/L agency in defining regulatory and control strategies for all such sites in their area.

In terms of program implementation, routine source reporting requirements under RCRA may have some benefits and use for tracking and monitoring air toxics emissions and compliance with air toxics regulations. It is possible the RCRA reports could be used as one means of enforcement. An air agency may be able to make use of the reported data either as is or by adding minimal additional questions to the routine reports, and accomplish its monitoring/enforcement goals. As with any coordination activity, extensive communication and initial planning will be necessary to gauge feasibility and ensure smooth operation.

4.3.3.3 OSHA Regulations

Regulations of the Occupational Safety and Health Administration (OSHA) can produce information beneficial to air toxics control program development. The primary benefits of OSHA are the identification of sources potentially emitting toxic compounds, the estimation of emissions rates and related process information, and the identification of control options for various processes and pollutants. In some cases air toxics control efforts may be able to piggyback on OSHA regulatory initiatives.

The primary objective of OSHA programs is worker protection from unsafe activities, including exposure to toxic chemicals. By limiting the amounts of a chemical that may be released into the workplace, some OSHA regulations may indirectly benefit air toxics control. For example, OSHA places very strict limits on the amount of toxic arsenic trioxide (As_2O_3) that arsenic acid production workers may be exposed to. As a result, all domestic manufacturers of arsenic acid have installed sophisticated capture and collection systems for arsenic trioxide dust. The benefit of these systems has been to greatly lower both workplace and ambient air arsenic trioxide releases.

Over 500 chemicals are regulated by OSHA in the workplace (29 CFR, Part 1910, Subpart 2). As a part of its Hazards Communication System, OSHA requires facilities to make available to employees and others, Material Safety Data Sheets (MSDS) for the chemicals present in the workplace environment. An assessment of facility MSDSs is a quick and easy way to determine what chemicals are present at a plant and which have potential for emission into ambient air. The OSHA also conducts special studies of particular processes/source categories to estimate chemical release rates and possible control measures. For example, studies have been conducted to estimate hexavalent chromium releases from electroplating processes and possible control options. Studies such as this and others, by groups such as the National Institute for Occupational Safety and Health (NIOSH), may be able to provide S/L air agencies with insightful information for problem definition and control strategy development phases of air toxics programs.

4.3.3.4 Clean Water Act Regulations

The principal value of coordination with the Clean Water Act (CWA) program is the potential identification and association of toxic chemicals of concern with specific plants and general industrial processes. Such associations may be indicative of potential air toxics emissions sources. The CWA program can also indicate what facilities have wastewater streams containing toxic chemicals of concern. Some of these chemicals may be ones that are readily volatilized and present air toxics problems. Sufficient CWA information may be available on toxic chemical loadings and discharge volumes to quantify air emissions.

The utility of CWA program information on air toxics control program development is probably much less than SARA Title III or RCRA, but the potential information overlap and coordination opportunities should not be overlooked.

4.4 MEASURING PROGRAM EFFECTIVENESS

The purpose of this subsection is to describe various techniques for measuring air toxics control program performance. The goal of this subsection is to present general criteria for the design of an effective program performance measurement system and to provide some example measurement techniques.

4.4.1 Need for an Air Toxics Program Performance Measurement System

Like criteria pollutant control programs, air toxics control programs have a need to assess their overall progress and effectiveness relative to specific program goals. For reasons of internal agency accountability, accountability to the legislature or local board/commission, and accountability to the general public, S/L agencies are commonly required to document the progress and effectiveness of their air pollution control programs. In addition, agencies are required to document program activities to qualify for grant funds from EPA (e.g., Clean Air Act Section 105 grants).

Program effectiveness measures also need to be considered right from the start during program design, and not as an afterthought.

Progress toward achievement of program goals can be categorized as administrative progress and control effectiveness. Administrative progress includes development of regulations, policy, or guidelines, the number or percent of sources inventoried, the number of multiyear development plan (MYDP) milestones met, the number of hiring and resource acquisition objectives achieved, or the number/percent of source reviews completed.

Control effectiveness refers to the results or "environmental payoff" of program implementation. This may include such items as the reduction in complaints, actual emission reductions, the amount of reduction in ambient concentrations of air toxics, or the reduction in public health risks.

Care needs to be taken to ensure that the measure being used to evaluate effectiveness is consistent with the goal being measured. For example, the effectiveness of a program that has a goal of developing and adopting an air toxics regulation is best measured through administrative progress and not control effectiveness. Obviously, since in this case the regulation has only been adopted and not yet implemented, one would expect little progress in control effectiveness measures. Measuring the effectiveness of this program through a control effectiveness measure (e.g., risk reduction) would indicate that the program was not effective even though it was successful in meeting the stated goal (i.e., adopting a regulation).

In developing a system for measuring the performance of an air toxics program, a S/L agency can and should draw upon the considerable experience it has acquired in tracking criteria air pollutant control programs. However, because of the human health ramifications of air toxics program, the measures of administrative progress and control effectiveness and the implications of the lack of progress and control are unique for air toxics programs in several respects. First, the pollutants involved are different and more numerous than in criteria programs. Second, programs that include a goal of reducing public health risks to a specified level may need to measure decreases in exposure and risk levels. Third, programs including acceptable ambient guidelines or standards need to include measures of progress in reducing air

toxics concentrations below those levels. Finally, S/L agencies receiving EPA grant funds for air toxics program development are required to report their progress according to special EPA program oversight procedures (i.e., MYDP milestones).

The ultimate goal of a performance measurement system is to measure program results. Needless to say, it is possible to expend a great deal of time, energy, and resources on an air toxics program with few or no measurable results. Therefore, S/L agencies and EPA need to be able to determine if any real progress in regulating air toxics is occurring as a result of S/L agency air toxics program activities.

Measurement of environmental payoff is a difficult (and expensive) aspect of an air toxics program to measure. For example, measurement of reductions in air toxics emissions actually achieved in practice can be either speculative or expensive to determine. Consequently, tracking systems designed to measure program performance may focus initially on administrative progress or on more qualitative measures performance, rather than on control effectiveness measures. Accordingly, a primary characteristic of systems to measure the performance of air toxics programs is a graduated approach to measuring administrative progress and control effectiveness. This graduated approach to tracking program performance is based on measures that range from the easiest to measure and most qualitative in nature to the most difficult and quantitative. As a program is implemented and matures, an agency should be able to measure program performance through use of increasingly more quantitative and results-oriented indices.

4.4.2 Performance Criteria

Design of performance criteria should consider the following:

(1) Measure progress/effectiveness relative to program goals. Progress/effectiveness measurement is a function of the primary program goals and the basic design of the program. As such, program performance measurement should provide information related to the achievement of program goals. As such, program performance measurement should provide information related to

the achievement of program goals. For example, some programs will want to show quantitative reductions in emissions to specified levels. The system should also be flexible enough to accommodate new goals and changes in program design that occur over time.

(2) Measure progress/effectiveness both qualitatively and quantitatively. Both qualitative and quantitative measures are necessary to fully evaluate a program's performance relative to its goals. Qualitative measures might include, for example, an evaluation of the program's overall progress in meeting program goals. Quantitative measures might include tracking the number of sources reviewed for air toxics each year, the number of sources inventoried, or reductions in the maximum individual risk (MIR) or incidence of cancer near high risk point sources (HRPS).

(3) Focus on the four National Air Toxics Strategy themes. The four themes of EPA's 1985 National Air Toxics Strategy provide a good focus for a performance measurement system. The themes include: (1) acceptance of NESHAP delegation, (2)addressing HRPS, (3) addressing high risk urban areas, and (4) enhancing S/L agency capability. Thus, for example, the system should measure progress in reducing emissions and risks associated with HRPS or the progress in accepting delegation of authority for enforcing NESHAP regulations.

(4) Use available sources of data. Several sources of information are available that may be useful in designing an effective program performance measurement system. These include NATICH, the 1989 STAPPA/ALAPCO survey of air toxics programs, and various EPA and State monitoring programs such as the Non-methane Organic Compound (NMOC) Monitoring Program. These and other sources of information can provide useful information that can be used as baseline measures.

(5) Include measures of agency capabilities to compare with other agencies. To allow an assessment of the investment in air toxics control over time and relative to the magnitude of the problem, measures of agency capabilities should be incorporated into any program tracking system. Such information can be used by S/L agencies for direct comparison to the investment levels of agencies in other States with comparable air quality programs, and by State agencies for comparison of investments in local agencies in their jurisdiction.

(6) Provide for flexibility and feedback. The performance tracking system should be flexible enough to accommodate new sources of information, new data collection techniques, and new goals. In addition, the system should provide feedback from the evaluation of program performance so that modifications in program goals or implementation can be made.

4.4.3 Example Measurement Techniques

No one measure of program progress can provide an accurate and comprehensive indication of results. Consequently, a combination or series of measures is necessary to comprise an effective performance tracking system.

Table 4-3 is a checklist of possible program progress and effectiveness measures. The checklist is grouped according to administrative progress (or program activity-oriented) measures and control effectiveness measures. Several of the measures expressed as "number of" could be expressed as percentages. The list is not intended to be exhaustive, but may serve to illustrate a number of program performance measures.

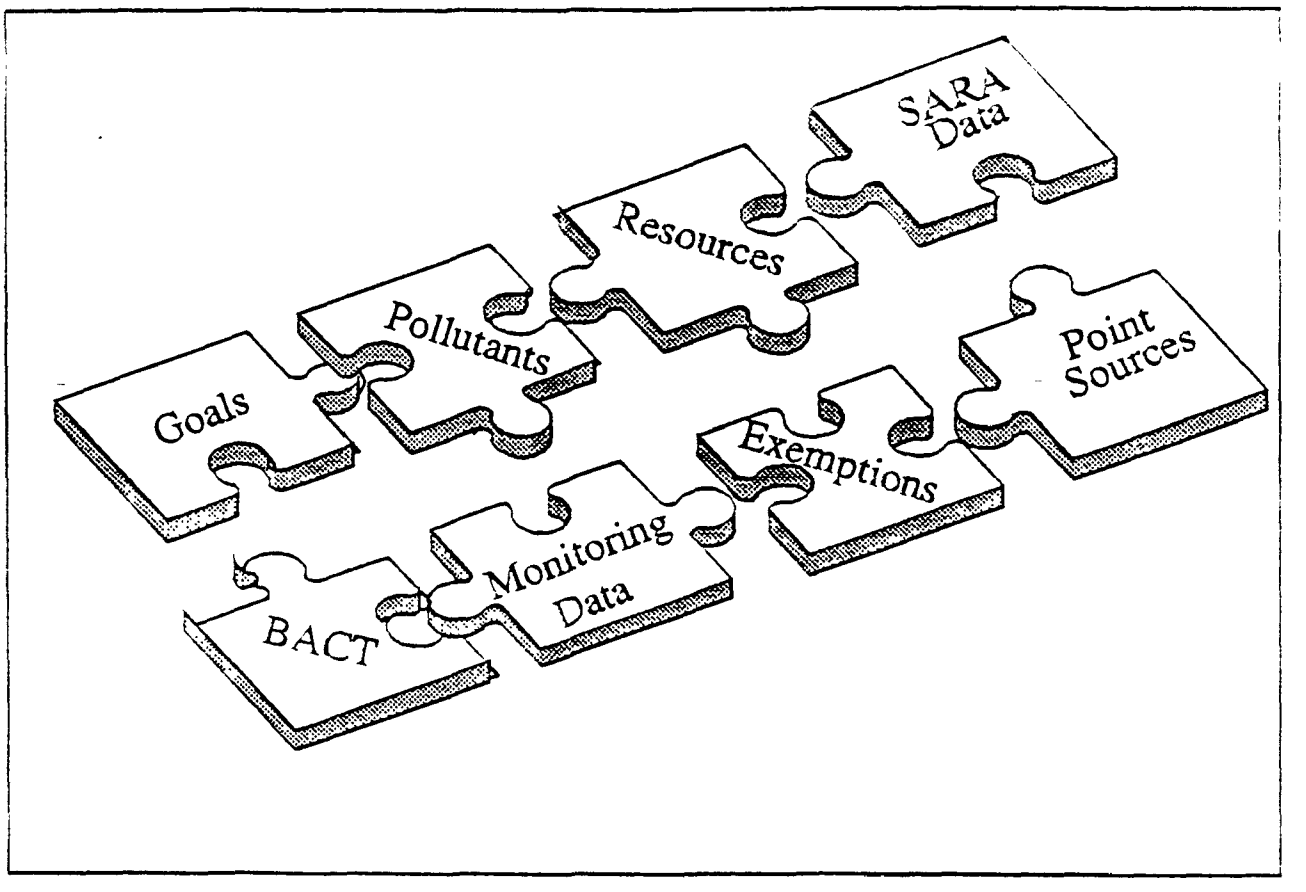
TABLE 4-3. EXAMPLE PROGRESS MEASUREMENT TECHNIQUES

Administrative Progress Measures

1. Number of MYDP milestones achieved.
2. Number of sources inventoried/surveyed.
3. Number of sources reviewed for air toxics.
4. Number of sources modeled (screening and/or detailed).
5. Achievement of major program goals (e.g., completion of draft regulations, approval of regulations, hiring of budgeted personnel, etc.)

Control Effectiveness Measures

1. Number of sources meeting AAL, target risk level, or control technology requirements.
2. Number of sources installing controls or making process changes for air toxics beyond what would otherwise be required for criteria pollutants.
3. Number of listed pollutants for which all sources are in compliance.
4. Number of HRPS in compliance.
5. Measurable risk reductions for HRPS (MIR and/or incidence).
6. Reductions in the volume of SARA Title III toxic air releases.
7. Improvements in monitored ambient conditions in high risk urban areas. (not otherwise due to industry shutdowns,curtailments, or reductions in mobile sources activity)
8. Achievement of major program goals related to results.
9. Number of air toxics-related complaints reviewed.


SARA Data
Resources
Pollutants
Goals
Point Sources
Exemptions
Monitoring Data
BACT

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16. ABSTRACT

This manual is intended to assist State and Local air pollution control agencies in making informed decisions about the development of air toxics control programs and to enhance consistency among the State and local program approaches. In particular, insight is provided into how to make critical decisions regarding program scope and stringency, evaluation of program impacts, and achievement of overall program goals. The manual addresses these issues by illustrating the experiences of State and local agencies and EPA in making air toxics program decisions. The manual was developed by seeking the advice and experiences of State and local agencies in various stages of their own program development. While this information does not represent EPA policy, it should prove useful to many State and local agencies now actively engaged in air toxics program development.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air toxics State and local programs (air toxics) Program development (air toxics) Air toxics strategies Control of air toxics		

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