OAQPS Air Toxics Strategy Team
Environmental Protection Agency
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Our intention is not that the "Draft Final Report" for an Integrated Air Toxics Program be circulated for the public's review and comment until it is indeed ready for release. It is not yet ready for distribution as a completed document. It remains in DRAFT FORM and is subject to changes by those who have worked together to create the strategies.

Nevertheless, since the draft report has inadvertently found its way to some people outside of the EPA, others concerned with our findings would like a copy. Accordingly we have agreed—most reluctantly—to make draft copies available to concerned parties solely on the basis of personal requests.

You will find such a draft copy enclosed with this. Please note that we are not looking for comments on this version of the report. It is sent to you only as a courtesy and to honor your request.

OAQPS Air Toxics Strategy Team

For review by Lydia and ADDs. July 9, 1996

# STRATEGIES FOR AN INTEGRATED AIR TOXICS PROGRAM

Draft Final Report
July 1996

OAQPS Air Toxics Strategy Team:

Dianne Byrne
Fred Dimmick
Michele Dubow
Eric Ginsburg
Dave Guinnup
Anne Pope
Holly Reid
Tim Smith
Al Wehe

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## I. PURPOSE AND INTRODUCTION

This report summarizes the findings and recommendations of the OAQPS staff effort to develop an integrated strategy for air toxics.

### A. Air toxics -- the problem

Billions of pounds of hazardous air pollutants (HAPs) are released in the United States each year. These air toxics pose a risk of harmful effects to public health or the environment. Potential health effects include leukemia and other cancers, impaired development in newborns and young children, and lung damage. Figure 1 displays the adverse health effects that may be associated with different HAPs. Potential environmental effects include harm to wildlife, aquatic life, or other natural resources, and significant degradation of environmental quality over broad areas.

Human health and environmental risk due to HAPs can result from exposure to individual facility emissions, mixtures of pollutants found in urban settings, and long-range transport of pollutants over regional, national or even global air sheds. The EPA is concerned about these risks and ranks them high when compared with other environmental problems addressed by the Agency. Work is underway to address many parts of the air toxics problem. However, data gaps in such areas as emissions, toxicity, atmospheric transformations and ambient concentrations hamper the EPA's effectiveness in reducing risks associated with HAPs. A more detailed discussion of the nature and magnitude of the air toxics problem is located in Appendix A.

### B. Purpose of the strategy

The purpose of developing an OAQPS air toxics strategy is to improve the administrative efficiency and environmental effectiveness of the Federal program that addresses air toxics. This strategy is a description of overall objectives for the program and the policies that, when carried out, would lead the program to its objectives. The air toxics strategy provides a vision statement for the program and strategic elements that would allow OAQPS to reach that vision.

Many programs are in place which directly or indirectly reduce the public's exposure to air toxics. Air toxics are directly regulated by the Federal program contained in section 112 of the Clean Air Act, as amended in 1990. The 1990 amendments direct EPA to establish national emission standards for air toxics emitters and to study a number of air toxic problems to determine whether additional reductions are needed.

## HAPs are pollutants associated with adverse health effects

| *Number of HAPS* | *Adverse Effects* |
|---|---|
| 108 | **Cancer*** |
| 54 | **Reproductive and/or Developmental** *(e.g., decreased fertility, birth defects)* |
| 24 | **Endocrine Disruption** *(e.g., reduced sperm count)* |
| 107 | **Central Nervous System** *(e.g., reductions in IQ levels)* |
| 100+ | **Other Effects** *(e.g., burning sensation in lungs)* |

*Includes known, probable and possible carcinogens.





Figure 1
HAPs are Pollutants Associated with Adverse Health Effects

In addition, air toxics are indirectly regulated by criteria pollutant programs, aimed at reducing particulate matter and volatile organic compounds, and by mobile source programs. Other important air toxics programs include State and local air toxics programs, and nonregulatory programs and initiatives.

Although much has been achieved by these programs[1], the potential remains for duplicating efforts, for establishing redundant or conflicting requirements, and for expending disproportionate energy on relatively low priority program elements. In addition, improvements to these programs have generally been identified within the individual programs, rather than in concert with each other. These potential problems underscore the challenge to EPA: to create a unified and comprehensive approach to the air toxics program for greater coordination, administrative efficiency, and effectiveness.

The purpose of this document is to provide an overall strategy for the air toxics program. This report is not intended as a detailed blueprint, with answers to all questions bearing on how the air toxics program can be improved. The strategy should serve to help provide guidance in the near-term by focusing efforts in the proper direction.

## C. Process to develop the strategy

To prepare this report, OAQPS assembled a team with representatives from the offices' four divisions. The OAQPS Air Toxics Strategy team was charged with developing an integrated air toxics strategy and suggesting how OAQPS could improve its internal work processes and use resources to implement the strategy during the next one to three years.

The team worked together to develop a list of the air toxic problems that exist and used the benefits of the team members' combined experience to develop a list of the measures and tools that contribute to solving those problems. The team developed an approach, involving an air toxics management model, for organizing the various pieces of the program into a complete and integrated strategy. The team used the results of this exercise to derive the strategy contained in this report.

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[1] The next section 112(s) report to Congress is in preparation. When released, this report will provide further detail on progress to date.

The report is intended primarily for use by OAQPS staff and managers. However, many of the principles and recommendations are equally important for EPA's partners in State and local agencies and other stakeholders such as representatives from industry and environmental organizations. Although the strategy is intended primarily to guide internal OAQPS efforts on air toxics, many of the recommendations involve improving the partnerships with State and local co-regulators, improving the efficiency of actions affecting the regulated community, and improving the responsiveness of the program to the needs of members of the public who are exposed to air toxics. Accordingly, it is important that this strategy not be developed in isolation.

In the process of developing this strategy, the OATS team considered general comments from a broad representation of affected stakeholders who were asked to respond to a questionnaire developed by the team. These discussions provided helpful background information in developing the strategy. OAQPS intends to pursue further discussions with stakeholders on the specific recommendations contained in the strategy, and to revise the strategy where warranted by those discussions.

**D. Overviews of the CAA approach to air toxics problems.**

The general thrust of section 112 of the Act since 1970 has been to establish national emission standards for HAPs. Controversies over how to interpret the language of the 1970 Act made it difficult to establish emission standards in a timely manner. In particular, the process for listing a pollutant as a HAP, and the requirement to "protect the public health with an ample margin of safety," resulted in disputes, lawsuits, and delays. The 1990 amendments (Public Law 101-549, November 15, 1990) were intended to increase the pace at which actions to protect public health and the environment were taken.

The 1990 amendments take a proactive approach in which 189 pollutants are listed by statute as HAPs. The amendments require EPA to list categories with significant emitters of the listed HAPs, and to issue technology-based emission standards for those categories over a 10-year timetable. To ensure adequate protection of public health and the environment, Congress further required that EPA determine whether these standards are adequate to prevent adverse health effects and serious or widespread environmental effects and take additional actions as necessary and appropriate. In response to specific concerns about the threats posed by numerous small sources of air toxics and by long-range transport and deposition of air toxics, Congress additionally established programs requiring EPA to evaluate and

take further actions as needed to prevent effects which may not be fully addressed through its emission standards program.

**E. Progress to Date**

EPA, the States, and the regulated community have taken the first major steps in the comprehensive air toxics program stablished by the 1990 amendments. EPA stands at the midpoint of the effort to publish a comprehensive set of technology-based standards which appear in 40 CFR Part 63. Standards already published to date, when implemented, will reduce air toxic emissions by 880,000 tons per year. The effort to develop the technology-based standards has been improved substantially by developing strong partnerships with State and local co-regulators. Assessments of threats posed by small urban area sources and by long range transport and deposition are well underway and are expected to further guide the emission standard setting process and lead to other strategies to protect public health and the environment.

While many of the efforts mandated by the 1990 amendments have been completed, much remains to be done. The technology-based standards that have already been published must be implemented and enforced. Additional technology-based standards must be written. Additional statutory mandates must be fulfilled, including: (1) the requirement to evaluate the residual health and environmental risk that remains after the technology-based standards are in place, and (2) the requirement to evaluate the need for further reductions based upon the results of the various special studies (urban, Great Waters, mercury, etc). One of EPA's main purposes in developing this strategy is to coordinate all these efforts in a way that can produce the greatest progress in reducing the health and environmental problems caused by air toxics.

## II. FRAMEWORK FOR THE STRATEGY -- A MODEL FOR THE AIR TOXICS PROGRAM

### A. Introduction

The OAQPS air toxics strategy is based on three findings. The first finding is that a more comprehensive framework for the air toxics program is needed, and this report proposes an air toxics management model for consideration. The remainder of this section discusses the air toxics management model in some detail. The second finding is that OAQPS needs to plan its activities to fit appropriately the variety of effects and exposures associated with the 189 HAPs. In other words, "one size fits all" solutions are not considered appropriate for the wide range of human health and environmental problems caused by air toxics. The third finding is that a more complete air toxics program needs to involve all stakeholders in proactive ways in carrying out the program's objectives. Without such involvement, the program will not achieve its ultimate purpose. The second and third findings are addressed in the strategy by incorporating policies within the air toxics management model to ensure that OAQPS activities are selected and completed consistent with these findings.

### B. Description of the air toxics management model.

In an effort to integrate the various components of the air toxics program into one comprehensive scheme, the team modified concepts from existing criteria pollutant programs to conform to air toxics program needs. The **air toxics management model**, shown schematically in Figure 2, is the result of these efforts. The most significant feature of the model is that it is structured around a feedback loop which allows for an iterative process to fully solve any particular air toxic problem, as well as to direct efforts over time to address additional pollutants as new information becomes available. The feedback loop is critical in determining whether specific response actions are actually achieving or approaching stated program goals. The individual components (boxes) of the model are discussed below.

#### Setting goals and objectives

This component of the model refers to the establishment of goals and the identification of specific measurable objectives. These goals and objectives can include effects-based, risk-based, exposure-based, emission-based, and air quality-based targets. Given the wide

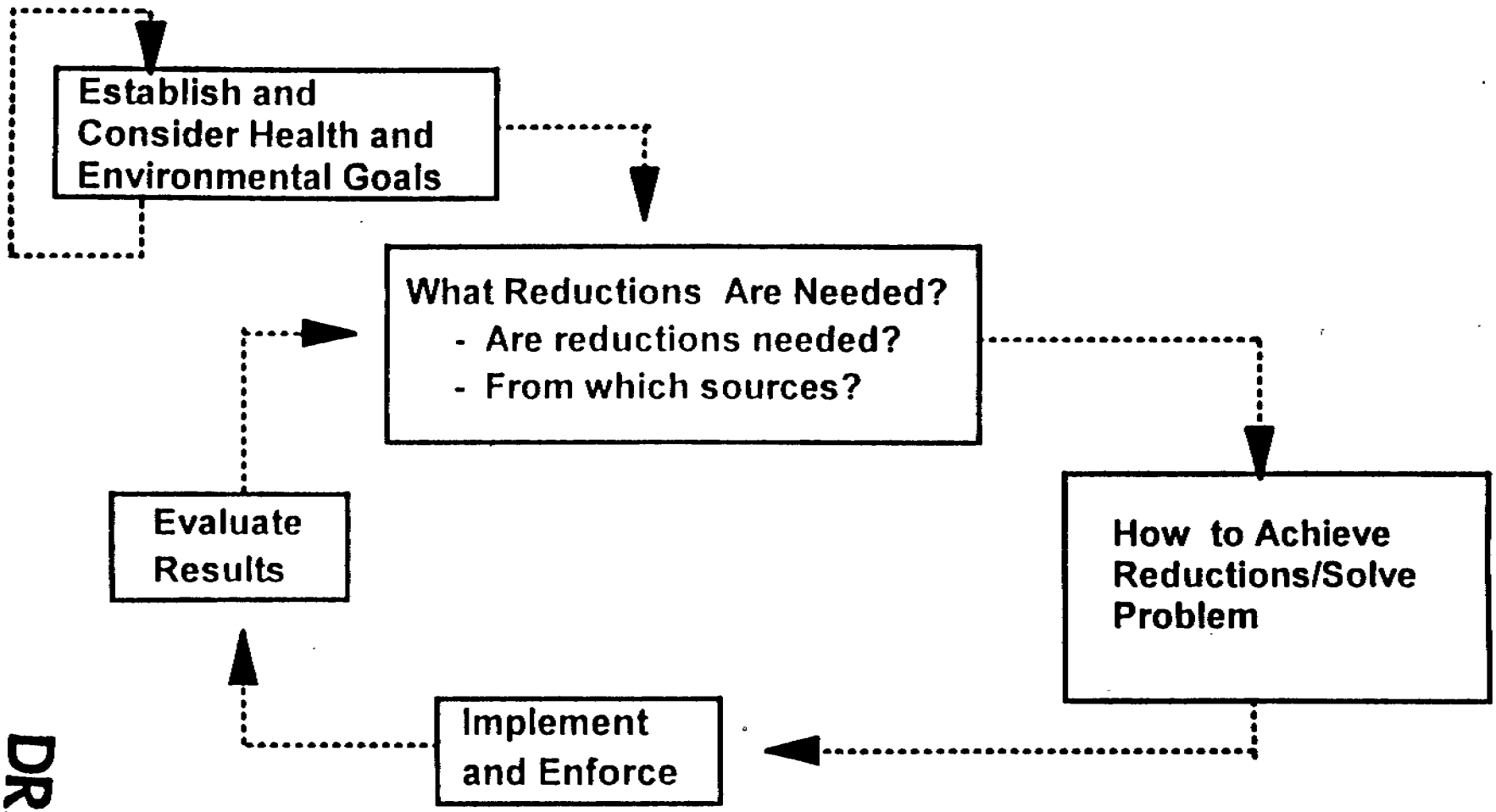


Figure 2.
Air Toxics Management Model

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variety of effects and exposures associated with air toxics, there will be multiple and varied goals for the program. It is important that the goals and objectives be quantitative and related as directly as possible to reducing detrimental human health and environmental effects.

**Identifying needed emission reductions**

This component involves identifying specific sources of HAPs and emission reductions needed from those sources to meet specified objectives. Moreover, for the broad scope of air toxics problems, this component involves the more general task of identifying emission reduction priorities.

**Achieving emission reductions**

This component involves taking actions to reduce emissions identified in the previous component. The actions include the various Federal and State regulatory and nonregulatory programs, and voluntary efforts and initiatives. In taking these actions, working with all stakeholders is the key to an effective and efficient program.

**Implementing regulatory and nonregulatory programs**

This component includes the activities necessary to ensure that the identified emission reductions are achieved in practice, including implementation and enforcement of regulatory programs, and implementation of nonregulatory approaches. In particular, it involves close coordination between EPA offices and EPA's partners on the State and local level since they are the primary implementers of the air toxics program.

**Evaluating progress**

This component involves establishing quantitative indicators, and tracking whether the implemented measures are actually achieving the intended goals. Indicators that directly measure progress toward a specific stated environmental goal are best; however, indirect or surrogate indicators will be needed for evaluating progress toward some goals.

In modified form, this type of model has been applied to many environmental problems. In particular, the criteria pollutant programs in OAQPS are organized around a version of this model (called the air quality management model) which uses

ambient pollutant concentration levels as stated targets and implements emission reduction activities to bring monitored ambient concentration levels below the specified targets. The air toxics management model seen here is viewed in a broader context with multiple goals because it involves multiple pollutants which contribute to pollution levels and a variety of effects on multiple geographic scales. Each individual stated goal will require counterparts in each of the other boxes of the model for the program to be complete.

The air toxics management model has, for the most part, not explicitly been applied to the air toxics program. As a result, although many successes have been achieved by the air toxics program, no systematic approach has been used to identify, address, and track the various aspects of the air toxics problem. The team finds the following are important attributes of applying the model to the air toxics program:

-- the model provides a means of communicating how the program elements fit together and how they contribute to solving the problem.

-- the model provides a direct means of identifying gaps in existing programs

-- the model provides for an iterative process that focuses on doing what is practicably achievable in the near term, while recognizing the need to periodically evaluate progress, and re-evaluate goals and program approaches.

C. Comparison of current approaches contained in section 112 of the Clean Air Act with the air toxics management model.

The air toxics management model can be used to illustrate how the pieces of section 112 of the Act fit together. Section 112 contains 19 separate subsections, many of which are programs in and of themselves within OAQPS. Appendix C contains a more detailed discussion of these statutory programs and how these statutory pieces relate to the five components of the model. Viewing the statutory pieces in the context of the model is useful in showing clearly how individual activities link to one another, and in showing how information obtained from one activity can help to support another. Use of the model thus serves as a useful framework for developing strategies to improve and integrate programs.

The exercise summarized in Appendix C also serves to identify program gaps. Two notable gaps are identified. First,

gaps exist in the current program with respect to goals and objectives. Although the statute implicitly calls for EPA to determine what is needed to prevent adverse health and environmental effects, a comprehensive set of quantitative objectives has not been developed. Second, gaps exist in our current ability to evaluate progress. While it appears that statutory authority exists (but without mandate) to create an information-gathering program to evaluate progress, such a program has not been developed. Filling both of these gaps is considered critical in the development of the overall strategy, discussed in the next section.

## III. THE OAQPS AIR TOXICS STRATEGY

This section contains a summary of the OAQPS air toxics strategy consistent with the overall framework discussed previously. The strategy is structured around the air toxics management model, and it is designed to address each of the five elements in the model: (1) goals and objectives, (2) priorities for reductions, (3) methods for achieving the reductions, (4) procedures for implementing and enforcing reduction measures, and (5) feedback and evaluation. In addressing each element of the model, the strategy reflects the need to address the variety of HAP effects and exposures and the need for proactive stakeholder involvement.

### A. Strategy -- Goals and Objectives

The strategy calls for the air toxics program to set goals and objectives that are based on achieving human health and environmental results. The strategy uses an overarching qualitative goal to describe the underlying purpose of the program; the strategy also uses quantitative goals to set the framework for measuring progress towards attaining the underlying purpose of the program. Program objectives, viewed as the major actions necessary to achive the goals, are used in setting priorities for near term activities and in measuring how well the program is attaining these priorities.

The overarching goal, or purpose, of the air toxics program is to protect public health with an ample margin of safety and to prevent significant and widespread adverse environmental effects, (accounting for uncertainties in effects and exposure information). Protecting the "public health" involves reducing or preventing the occurrence of adverse effects associated with human exposure to hazardous substances. Protecting the environment involves reducing or preventing effects on wildlife, threatened or endangered species, aquatic life, and other natural resources.

The quantitative goals are measurable, long-term targets, and are associated with dates by which they can and should be achieved. Examples of goals are listed below. These examples represent a format that is desirable for goals. The target dates and numerical values (e.g., percentages, risk numbers) are not intended as actual recommendations, but rather as appropriate ways to express the goals and as good starting points for refining the goals. Some are effects-based, while others are focused on emission reductions as the most immediate means towards reaching the effects-based goals.

**Examples of Quantitative Goals**

o Reduce total U.S. emissions of HAPs by 75% by the year 2000.

o Protect public health so that, by the year 2010, no U.S. HAP emission source poses a cancer risk greater than one in ten thousand to the exposed population.

o Protect public health so that, by the year 2010, the majority of people living in the vicinity of emission sources do not experience a cancer risk attributable to HAPs in excess of one in one million.

o Reduce airborne mercury deposition to U.S. lakes and streams by 50% by 2010.

o Reduce the occurrence of childhood leukemia attributable to HAPs by 75% by the year 2020.

o Reduce urban cancer incidence attributable to HAPs by 75% by the year 2020 by achieving appropriate reductions in ambient concentrations of identified HAPs.

Examples of Program Objectives

Examples of short and long-term program objectives include:

o Develop emission standards for 174 source categories by the year 2000 that reduce HAP emissions to a consistent, equitable level that reflects effective control technology.

o Identify and prioritize the top 10 pollutants found in urban air by the year 1997.

o Subject to control, wherever feasible, all sources contributing to the top 10 urban pollutants by the year 2005.

o Establish health and environmental objectives (e.g., body burdens, ambient levels) for 10 pollutants by 2005 which, when met, will result in adequate protection of public health and the environment from known or anticipated effects.



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**B. Strategy -- Identifying priorities for Emission Reductions**

The air toxics program should not disregard potential exposures and effects from any HAP, but should nonetheless prioritize its efforts such that the most well-understood hazardous pollutants and problems are dealt with as soon and as well as possible. The program should particularly emphasize greater control of HAPs which are more highly toxic and to which greater numbers of people are exposed.

**Development of a "Priority List"**

OAQPS should focus its efforts on pollutants that are believed to pose the most harm to public health and the environment, based on available information. Accordingly, OAQPS should develop an approach for identifying a relatively short list of "priority pollutants." This approach would help identify which sources to regulate beyond the minimum statutory requirements (i.e., the MACT floor), which standards to pay special attention to during implementation and enforcement, and which HAPs to ensure are evaluated for determining the effectiveness of the program. In addition, the identification of a short list of high-concern pollutants will help focus the efforts of the research community on the pollutants being addressed by OAQPS. Support for major regulatory decisions would be improved if, in addition to emissions information and health benchmarks, the Agency also had information on how each chemical is distributed within the human body and causes its effects (pharmacokinetics) and on whether exposure can be demonstrated via actual tissue samples (biomarkers). Currently, research is often fragmented and not coordinated well with the needs of OAQPS. A short list of priority pollutants would facilitate this coordination. An initial attempt to develop a list to support this approach is summarized in Appendix B.

This is not intended to suggest that emissions of the pollutants not included on the priority list should be ignored. Unless there is adequate justification for removing pollutants from the HAP list entirely, EPA should continue to address these pollutants in the technology standard-setting process. In addition, health data-gathering efforts should continue for the many HAPs with an incomplete health database, and to address general issues related to atmospheric transformation, chemical mixtures, etc.

**Identify where Additional Emission Reduction Efforts Can Achieve the Greatest Results**

In addition to using a priority pollutant list, there are a number of analytical efforts underway that will provide useful information on air toxics emission reduction priorities. The urban air toxics effort, the residual risk report, the mercury and Great Waters studies, for instance, will help to further identify where emission reduction efforts can achieve the greatest environmental results.

**Identify where Regulation is not Needed**

Where health criteria exist for sufficiently well-studied pollutants, it is important to make use of the available information to insure that OAQPS is not expending efforts on regulations that are not needed. There are several ways that this can be done: (1) by de-listing pollutants, (2) by de-listing source categories, (3) by making appropriate use of section 112(d)(4) to govern the stringency of controls in the MACT standard-setting process, and (4) by establishing applicability criteria in the MACT standards (where appropriate) that exempt facilities whose emissions are not considered to pose a risk problem. These are important tools that should be used when justified by information currently available to OAQPS or made available to OAQPS.

C. Strategy -- How to Achieve Reductions

Technology-based standards -- the MACT program

The MACT program remains the emission control foundation for the air toxics program. The strategy recommends maintaining the approach contained in the 1990 amendments, and it does not recommend reverting to a system to where a risk demonstration must precede the development of emission standards, but such analyses may be warranted where EPA is considering options regarding the relative stringency of the standards.

OAQPS needs to continue to work with State and local co-regulators, and with industry and environmental group stakeholders, to improve the process for developing emission standards. This needs to be accomplished in ways that achieve environmental goals while being more responsive to administrative and implementation concerns.

There are several MACT standards that are due by November 2000 for which there are very few sources (e.g., less than five sources) in the source category to be regulated. For such source categories, OAQPS should develop a regulatory approach that significantly reduces the amount of rulemaking process and that

increases the environmental effectiveness and practical achievability of MACT for these sources. One approach would be to define "presumptive" levels of control technology that are mutually agreeable to all stakeholders (developed through a MACT Partnership) as consistent with the statutory definition of MACT. Under this approach, EPA would then develop a single generic Federal standard that would apply to such source categories, in a way that would allow the "presumptive MACT" determination to be incorporated in a source's title V permit.

**Residual risk standards**

In order to accelerate and improve environmental results with greater flexibility for States and regulated industries, OAQPS, States, the regulated community and other stakeholders should strive to expeditiously identify and address the residual risk remaining after implementation of the technology-based section 112 standards. Early efforts to address risk (e.g., during the process for establishing section 112(d) standards or in the establisment of State air toxics regulations and permit conditions) could greatly reduce the need for national residual risk standards. There are a number of ways the strategy envisions this could happen.

First, wherever possible, EPA should assess the likelihood for residual risk when writing MACT standards, with particular attention given to the "priority list" [i.e., the Appendix B list as modified over time). It would be preferable to publish MACT standards that are sufficiently stringent to address the residual risk problem, rather than to revisit that standard at a later date.

Second, the residual risk program should ensure a strong partnership with State risk-based air toxics programs. OAQPS should seek ways of encouraging and strengthening those programs and working with State and local co-regulators to maximize the capability of those programs to provide early solutions to residual risk problems. OAQPS should seek ways to provide State programs with a substantial degree of flexibility, so long as there is an appropriate framework for accountability for residual risk results.

Third, the process for setting Federal residual risk standards should involve the active participation of source owners. The EPA should use such involvement to create a means for source owners to identify and seek flexible solutions to residual risk problems.

Fourth, where early efforts have not achieved appropriate residual risk results, the EPA should continue with its plan to establish national, risk-based emission standards.

**Other standards**

OAQPS, States, the regulated community and other stakeholders should work together to identify and assess air toxics-related health and environmental problems which may not by fully addressed by the MACT and residual risk provisions of section 112. Such problem identification necessitates:

- o gathering and sharing pollutant-specific emissions information for sources and geographic areas,
- o modeling emissions data to estimate ambient concentrations,
- o measuring ambient levels where warranted,
- o predicting exposure to ambient levels, based on demographic data, and
- o comparing population exposure to health effects information to determine whether excessive risk is likely.

Once the problems have been identified, the stakeholders need to devise appropriate actions to resolve them. Such actions could include listing area sources contributing to urban exposure and including those sources as part of the urban strategy; creating geographically-based initiatives to address problems that are unique to specific areas; and creating emission caps and annual reduction goals for persistent HAPs such as mercury.

**D. Strategy -- Implementation and Enforcement**

EPA needs to do a better job of anticipating issues related to program implementation, rather than reacting to problems once regulations have been promulgated. This effort should address better integrating toxics program regulations with each other as well as with other Federal control and permitting programs. It should also address how State and Federal air toxics programs may be better integrated in the rule development stages.

The strategy recognizes that State and local agencies have primary responsibility for implementing and enforcing the control measures that are designed to reduce exposures to air toxics. Improvement of role definition and partnerships will maximize the

efficiency and effectiveness of limited resources at all levels and will take advantage of the considerable skills and knowledge at the State and local level.

OAQPS and its co-regulators at the State and Regional levels, as well as other EPA offices such as OECA and OSWER, have already identified a list of priorities and actions for the near term to address the program's current and future implementation needs. These include defining implementation roles and responsibilities across and within levels of government, developing focused implementation strategies, producing enabling materials, reinventing the process by which State and local agencies may receive delegation for implementing Federal toxics regulations, and developing and improving processes for sharing information and communicating program goals and successes to the public. Similarly, co-regulators have identified targeted compliance assurance and enforcement strategies as critical to ensuring that the identified emission reductions are achieved in practice. OAQPS needs to take a leadership role in ensuring that these activities continue and fully consider actions and recommendations arising from this strategy.

## E. Strategy -- Feedback and Evaluation.

### Need for Improved Indicators

OAQPS needs to establish a program for an improved information base for evaluating progress in achieving the goals and objectives of the air toxics program. The information base would help EPA and stakeholders to recognize the existence of air toxics problem areas, lessen uncertainties in program planning, allow for measures of program effectiveness, and improve the public's understanding of the program.

Efforts are needed to define the types of indicators that would best serve the program. The effort to define these indicators should take into account what is achievable as a practical matter, and should be closely coordinated with the efforts described above to set goals and objectives. Among the components needed for an effective feedback and evaluation program are monitoring, emissions data, modeling, and appropriate trends analysis techniques.

### Use of ambient monitoring

Ambient monitoring is particularly useful as an indicator of program success as it relates directly to urban exposures. Because relatively few pollutants appear to dominate toxic exposures in urban areas, it would appear particularly important

and feasible to establish a network for measuring ambient trends for those few pollutants. Such a measurement system need not involve a comprehensive network in all cities, but rather could focus on a subset of cities as indicator areas, possibly building on existing monitoring efforts for criteria pollutants. At a minimum, such trends information should provide a representative picture of urban ambient trends. In addition, exploratory (possibly mobile) monitoring could be used to identify problem areas warranting special consideration or sources of toxic air pollution previously unrecognized. Further, indicators should be developed for exposure and risk which are derived from ambient concentrations and which take into account quantitative health or ecological benchmark information.

**Use of emissions data**

Emissions data are useful for evaluating the results of program efforts, particularly in cases where ambient monitoring or comprehensive exposure and risk analyses cannot be performed. This is likely to be the case for evaluating changes in localized emissions due to MACT regulations on many major stationary sources of HAPs. A strategy for making the best use of emissions data should recognize the following:

First, it would be very useful to develop a way of "weighting" emission rates according to their toxicities. Currently, emission trends for air toxics are almost always reported in terms of total emissions across a variety of pollutants. Total emissions can be a useful indicator, particularly where toxicity data are unavailable or sparse, but a "weighted" total, where feasible, would be far more meaningful with respect to evaluating progress toward exposure-based or risk-based objectives.

Second, emission trends in the toxic release inventory (TRI), while generally reliable, paint a very incomplete picture of air toxic trends. OAQPS efforts to fill in the gaps left by TRI should be increased, as discussed further in Appendix E.

Third, for emission inventory information to be a useful indicator of air toxic trends, it is not necessary to develop a national "bottom-up" inventory, nor is it necessary to have an inventory of all 189 HAPs. The effort should initially focus on a shorter list of pollutants, such as the list included in Appendix B, and should identify streamlined ways of determining national trends for those pollutants.

**Use of modeling data**

Exposure and risk indicators for some air toxics problems can be estimated using transport and dispersion modeling with emissions data as inputs. Indicators derived in this way can be directly useful in assessing program success relative to objectives based on local exposure and risk targets. Further, such modeling can facilitate the development of composite indicators to evaluate program success on a regional or national scale. Often, such derived indicators (which require knowledge of emission rates before and after control efforts) may be the only means of estimating program success in situations where ambient monitoring methods are undeveloped, or where they are too difficult or too costly to implement for every situation.

**Communicating the Trends Results**

An important OAQPS function is the development of ways to communicate national trends information to air quality managers and to the public. Outreach efforts are necessary to ensure that the trends indicators being developed are useful to these customers. National trends of indicators based on monitoring, emissions inventories, and modeling results will all be useful in evaluating and communicating program success. In addition, to assist in the public communication effort, consideration should be given to the development of a "pollutant standards index," or PSI, for all air toxics, or subsets of toxic air pollutants with similar health or environmental effects. A discussion of one possible approach for developing an air toxic PSI is attached to this report as Appendix E.

**F. Strategy -- A Strategic Matrix**

A complete air toxics strategy is one which addresses the entire air toxics program, does not ignore important sub-elements, and which makes appropriate strategic choices on how to use the available tools to address those sub-elements, consistent with the overall strategy. A strategic matrix is provided in Appendix D as an example of a planning tool which illustrates how the strategy can achieve these multiple aims. This matrix provides the level of detail needed for experts in the field of air toxics, both within and outside OAQPS, to understand better the policy and resource effects of the strategy. Although much effort has gone into developing the details found in the matrix, additional efforts are needed to continue to flesh out further details and the resource and work product implications for both the overall strategy and its sub-strategies. The matrix, although certainly incomplete and imperfect, provides a useful

starting point for detailed strategy-planning efforts, as called for in the next chapter.

## IV. NEXT STEPS: RECOMMENDATIONS FOR PUTTING AN INTEGRATED AIR TOXICS STRATEGY IN PLACE

An overall action plan is needed to implement the OAQPS air toxics strategy. The action plan will involve a number of planning and coordination activities. While these activities are intended to explore the implications of the strategy, there are a number of critical projects that should be included. The overall planning and coordination activities, and a list of critical projects, are discussed in this section. These activities are envisioned to take place over the next 3-6 months.

### A. Planning and Coordination Activities for Making the Air Toxics Strategy Work

Development of an action plan is important for making the air toxics strategy a reality. There are three major types of activities that must be take place in order for the OAQPS air toxics strategy to be effective. These activities are:

(1) within 3 months, identify and begin to carry out concrete steps to involve stakeholders,

(2) within 3 months, develop program plans that put the strategy into place for specific areas of OAQPS program responsibility, and

(3) within 3 months, develop a management plan that ensures a continued proper focus on the air toxic program objectives, adequate resources, and delegation of program elements to program staff in such a manner as to foster communication, cooperation, and productive effort.

Each of these activities is discussed below.

#### 1. Action Plan: Stakeholder Involvement in and Contributions to the Air Toxics Strategy

Although the strategy is primarily aimed at OAQPS activities, many of the strategic policies involve participation by other stakeholders. Active acceptance of these policies will be important to the success of the strategy.

The action plan should identify the stakeholders, the important segments where stakeholder involvement is appropriate, the periods in the implementation schedule where involvement should occur, and the type and purpose of the involvement.

The action plan should recognize that a public outreach program should be created that communicates with the general public in meaningful ways. For example, goals and objectives contained in the air toxics strategy should be in terms the public can readily understand, even though EPA may use more complex, technically appropriate goals for its internal use and communication.

Other stakeholder groups or their representatives may contribute to the development and implementation of specific components of the strategy. Accordingly, OAQPS should make maximum use of the partnership activities that it currently has in place and should expand partnership opportunities where they promise to be effective.

**2. Action Plan: Development of Action Plans to Put the Strategy into Place**

Because coordination within OAQPS is so vital to the success of putting the strategy into place, OAQPS group leaders are the key persons to develop this action plan. Group leaders should plan a 2-3 day working session away from OAQPS to develop the action plan. This meeting's primary objective is to work out the elements of a plan that will make the air toxics strategy an integral part of OAQPS's organizational culture, and foster effective staff interaction. This meeting should use the strategic matrix in Appendix D as an integral part of the discussion. This effort includes providing input to management, through the four division directors, that will assist the directors in developing a management plan that accomplishes the objectives outlined in the next section. This action plan should be completed in two months.

**3. Action Plan: Development of a Management Plan**

The purpose of this plan is to ensure a continued focus on the air toxic program objectives, directing resources, accountability, and delegation of program elements to program managers and staff. The division directors should complete this action plan in three months. The plan should include

- a focal person or multi-divisional committee that is responsible for developing and communicating the thrust of the air toxics program, bringing together the organization's elements into a comprehensive and integrated effort,
- an efficient resource allocation process, and

- measures of accountability for the successful conduct of the air toxics program.

## B. Critical Projects

In addition to development of an operational action plan, OAQPS must undertake a number of specific projects in addressing various elements of the strategy. OAQPS staff involvement in these projects is vital to the success of the strategy. A list of specific projects is outlined below. This list is not intended to be exhaustive, and certainly the activities described above will result in additional projects. The purpose of providing this list is to identify certain projects seen today as critical, and to provide specific examples of the types of additional projects that should be identified consistent with the overall strategy. All of the following projects are envisioned for completion within the next 6 months:

Project 1 - A team should identify health and environmental effects benchmarks which currently exist for HAPs. This team should assess and report on the feasibility of using these benchmarks as quantitative health and environmental objectives for MACT, residual risk, and control strategy planning.

Project 2 - Considering the results of Project 1, a team should develop a proposed mechanism for setting, reviewing and revising a set of quantitative health and environmental objectives, which provides for peer and stakeholder review.

Project 3 - A team should assess and summarize the state of analytical tools and the appropriate use of those tools for assessing the severity of air toxics problems and estimating needed HAP reductions (this should include monitoring, modeling, emission inventory tools, risk assessment, etc.).

Project 4 - A team should develop an internal process for coordinating among efforts to achieve emission reductions and for ensuring appropriate institutional mechanisms for implementing all elements of the program.

Project 5 - A team should develop a plan for organizing and carrying out an air toxics tracking and evaluation program, including indicators, collection methods, and infrastructure needs. This plan should take into account resource constraints. EMAD should work with other divisions to

identify the appropriate uses of monitoring, emission inventories, modeling, etc., in developing this program. This effort should be coordinated with Projects 1 and 2 so that the chosen indicators are directly relevant to the identified quantitative objectives.

Project 6 - A team should conduct a more thorough statutory analysis of section 112 authorities and gaps in our implementation of those authorities.

Project 7 - Teams currently developing programs under section 112 should evaluate the strategy-specific recommendations contained in this report and consider how they will respond to them.

Project 8 - ESD should work with States to provide a more detailed plan for evaluating the approach described in the strategy for source categories with only a few sources in the category.

Project 9 - AQSSD should define a strategy for identifying potential risk problems. This strategy should explore the use of emission inventories, data on ambient concentrations, and census data in producing "risk maps" as a basis for prioritizing risk reduction efforts.

Project 10 - An implementation team consisting of OAQPS (ITPID lead, with input from other divisions), OECA, Regions and States should develop a specific plan for addressing issues such as implementation of area source standards, prioritizing enforcement activities, and identifying appropriate roles for EPA regions, States, OECA and OAQPS.

Project 11 - A team should explore the potential for co-control of toxics and criteria pollutants via the ozone, PM, MACT and mobile source programs. A team was created to address co-control opportunities at the request of staff developing this air toxics strategy. However, competing priorities prevented the team from addressing this task.

Project 12 - AQSSD, in conjunction with ORD, should develop a decision framework for addressing noncancer risk. This framework should include criteria for evaluating exceedances of reference concentrations and for determining when such exceedances are unacceptable. This team should also act as a focal point for OAQPS and ORD coordination with regards to communicating long-term research needs in air toxics.

## APPENDIX A. CHARACTERIZATION OF AIR TOXICS.

[Note to Lydia and ADDs: This appendix is nearing completion. It is a 15-20 page description of the magnitude and nature of the various scales of the air toxics problem. The team felt it preferable to provide this to you within the next few days rather than to provide a version that did not reflect input from the entire team]

## APPENDIX B. BACKGROUND ON THE LIST OF PRIORITY HAP

The following list of HAP represents those HAP which, based on available data, are of high concern with regard to posing a public health or environmental concern. The list includes pollutants that are of concern for one or more reasons, including high toxicity; persistence in the environment; presence in urban areas, where they may be causing a threat to public health; identification in the Great Waters report as a pollutant of concern due to deposition; or, designation as a Clean Air Act section 112(c)(6) pollutant. It reflects an attempt to integrate the health and risk-based provisions of section 112 into a single set of HAP that AQSSD can best support regulating.

**This list should not be construed to mean that other pollutants on the HAP list are not of concern.** Rather, the list of 37 includes HAP for which we have the best supporting rationale to offer, based on data regarding their potential impact on public health. **As new data on HAP become available, the list will be subject to change,** with additions and deletions of HAP being a possibility.

**This list of HAP is intended to be used as an internal tool** that can assist in prioritizing MACT sources for regulation development. The list focuses on HAP that can be regulated under sections 112 or 129 of the Clean Air Act. Thus, HAP that are emitted by stationary sources are of most interest. The list does not reflect emissions from mobile sources or non-classical sources (e.g., pesticide application) since these are not within the authority of the MACT program to regulate.

The list is organized into two parts. Part 1 of the table lists "priority" HAP and notes significant features of each pollutant. Part 2 of the table is a list of additional HAP of concern that are not included on the "priority" HAP list. These are HAP that are either regulated under other federal authorities (e.g., the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)) or that are not emitted by 5 or more facilities (based on available data).

The criteria used in selecting HAP for the "priority" list are provided on the last page.

Part 1. List of 37 pollutants on the "priority" list

| HAP (≥5 facilities)[a] | UASP HAP[b] | Great Waters[c]/ 112(c)(6)[d] | Highly Toxic HAP[e] |
|---|---|---|---|
| Acetaldehyde | x | | |
| Acrolein | x | | x |
| Acrylamide | | | x |
| Acrylonitrile | | | x |
| Arsenic and compounds | x | | x |
| Antimony and compds | | | x |
| Benzene | x | | x |
| Beryllium and compds | | | x |
| Bis(2-chloroethyl) ether | | | x |
| 1,3-Butadiene | x | | x |
| Cadmium and compds | x | x | x |
| Chloroform | x | | |
| Chromium and compds | x | | x |
| Coke oven emissions | | | x |
| 2,3,7,8-TCDF | x | x | x |
| 2,3,7,8-TCDD | x | x | x |
| Ethylene dibromide | | | x |
| Ethylene dichloride | | | x |
| Ethylene oxide | x[f] | | x |
| Formaldehyde | x | | |
| Glycol ethers | x[f] | | |
| Hydrazine | | | x |

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| HAP (≥5 facilities)[a] | UASP HAP[b] | Great Waters[c]/ 112(c)(6)[d] | Highly Toxic HAP[e] |
|---|---|---|---|
| Lead and compounds | x | x | x |
| Manganese and compds | | | x |
| Mercury and compds. | x | x | x |
| Methylene chloride | x | | |
| MDI | | | x |
| Nickel and compounds | | | x |
| Phosgene | | | x |
| POM (PAHs) | x | x | x |
| Styrene | x[f] | | |
| Tetrachloroethylene | x | | |
| Trichloroethylene | x | | |
| Toluene | x | | |
| 2,4-Toluene diisocyanate | | | x |
| Vinyl chloride | | | x |
| Xylenes | x[f] | | |

Part 2. Explanation of Why Certain Additional Pollutants Were Not Included on the List

| HAP | UASP HAP[b] | Great Waters[c]/ 112(c)(6)[d] | Highly Toxic HAP[e] | Issues Related to "Priority" Status of HAP |
|---|---|---|---|---|
| Asbestos | x | | x | Source category delisted. Emissions are mainly from demolition activities. |
| Benzidine | | | x | 1 facility[f] |
| Bis(chloromethyl) ether | | | x | 2 facilities[f] |
| 2-Chloroacetophenone | | | x | 0 facilities[f] |
| Chloromethyl methyl ether | | | x | 4 facilities[f] |
| 1,2-Dibromo-3-chloropropane | | | x | 0 facilities[f] |
| 1,2-Diphenylhydrazine | | | x | 0 facilities[f] |
| Hexamethylene-1,6-diisocyanate | | | x | 0 facilities[f] |
| Phosphine | | | x | 0 facilities[f] |
| Carbon tetrachloride | x | | | Being phased out by 2000, under Title VI of the CAA |
| Methyl chloroform | x | | | Being phased out by 2002, under Title VI of the CAA |
| Chlordane | | x | x | Regulated by FIFRA |
| DDE/DDT | | x | | Regulated by FIFRA |
| Heptachlor | | | x | Regulated by FIFRA |
| Hexachlorobenzene | | x | x | Regulated by FIFRA |
| Lindane (all isomers) | | x | | Regulated by FIFRA |
| Toxaphene | | x | x | Regulated by FIFRA |
| PCBs | | x | | Regulated by TSCA |

Footnotes:

[a] HAP shown in this portion of the table reflect those emitted by at least 5 facilities, as reported to the T xic Release Inventory System (TRIS) for 1993.

[b] Urban Area Source Program (UASP) HAP.

[c] Great Waters HAP of concern, from the 1994 report to Congress.

[d] The section 112(c)(6) pollutants are also Great Waters HAP of concern.

[e] Highly toxic HAP are those HAP with a reference concentration of less than $5x10^{-3}mg/m^3$ (noncancer effects); a weight of evidence classification of A (known human carcinogen) or B1 (probable human carcinogen); or, a verified unit risk estimate of greater than $2x10^{-5}$ $(ug/m^3)^{-1}$ and a weight of evidence classification of A or B.

[f] Potential UASP HAP of concern, due to high emissions and to toxicity.

[g] Data on the number of facilities emitting the HAP are from the Toxic Release Information System (reporting year 1993), and, therefore, do not fully reflect the possible sources of emissions of the HAP.

## CRITERIA USED FOR SELECTING PRIORITY HAP:

Hazardous air pollutants (HAP) that meet the following criteria were selected as priority HAP for the MACT program:

1) One or more of the following applies. The HAP:

a) is a Great Waters HAP of concern (listed in the 1994 Great Waters report), or

b) is an Urban Area Source Program (UASP) HAP or a potential UASP HAP, or

c) has a reference concentration (RfC) of less than $5x10^{-4}$ mg/m$^3$ *, or

d) has a weight of evidence (WOE) classification of A or B1, or

e) has an EPA verified inhalation unit risk estimate of greater than $2x10^{-5}$ (ug/m$^3$)$^{-1}$ and an EPA WOE classification of A or B;

and,

) 1993 TRI data for the HAP indicate that it is emitted by 5 or more facilities. For the four HAP on the list for which no TRI data are available, they are known to be emitted by more than 5 facilities which are subject to MACT.

* The RfC cutoff of $5x10^{-4}$ mg/m$^3$ is based on dispersion modeling results for a facility that emits 10 tons/year of the HAP from a 10 meter stack. The resulting concentration of HAP at a receptor that is 200 meters from such an emission point is $5x10^{-3}$ mg/m$^3$. Assuming that the parameters selected are, in general, reasonable and appropriate, and that an exceedance of the RfC by a factor of 10 is unacceptable, the cutoff would be $5x10^{-4}$ mg/m$^3$.
(Calculation: RfC x 10 < $5x10^{-3}$mg/m$^3$ => RfC < $5x10^{-4}$mg/m$^3$)

**APPENDIX C. COMPARISON OF CURRENT APPROACHES CONTAINED IN SECTION 112 OF THE CLEAN AIR ACT WITH THE AIR TOXICS MANAGEMENT MODEL.**

While section 112 contains 19 separate subsections, many of them constituting programs in and of themselves, they can largely be organized around the air toxics management model. Figure 3 displays the statutory programs and their relationship to the various components of the model. This comparison of the current program to the air toxics model is useful because it suggests a number of interprogram links and corresponding coordination needs and because it highlights some definite gaps in the statutory scheme, gaps that will exist unless concerted efforts are made to fill them, and ambiguities in statutory authority or direction.

Health and Environmental Objectives

The statute contains provisions to address a number of different air toxics problems. For some of the air toxics problems, the goals and objectives are explicitly stated. For others, they are implicitly stated, or were left intentionally ambiguous to be identified at a later date. To establish health and environmental objectives, two actions are needed: to identify the pollutants of concern and to establish the levels, concentrations, or other measures which provide the requisite level of protection.

A framework for identifying pollutants of concern is provided in the Act with the list of 189 HAPs contained in section 112(b), which identifies pollutants which are of concern for health or environmental effects, and a process to add or delete pollutants. This list and the process for identification of HAPs are supplemented by the requirements of section 112(m) to identify and assess atmospherically-deposited HAPs to determine whether they cause adverse health or environmental effects, of section 112(k) to identify and characterize HAPs and their effects in urban areas, including products of atmospheric transformation, and of section 112(f) to identify health effects and risks presented by concentrations of HAPs, both background and produced by specific sources.

To establish appropriate levels of health and environmental protection, the section 112(f) residual risk program provides the key authority to establish air toxic goals which are sufficient to protect public health with an ample margin of safety, as well as to prevent serious or widespread adverse environmental effects, specifically mentioning risk targets for maximum exposed individuals. To complement these efforts, the section 112(k) urban area source program is required to reduce the incidence of stationary source-related cancer by at least 75%. Additionally, the section 112(m) Great Waters program is required to prevent adverse health and/or environmental effects related to atmospheric deposition. The Act does not define specific goals for the Great Waters program, but requires EPA to determine

whether section 112 provisions are adequate to prevent adverse health and environmental effects, thereby impliedly granting authority to EPA to establish appropriate objectives or benchmarks for such protection. Additional support to the identification of acceptable (or necessary) objectives for health and environmental protection are provided through scientific studies under section 112(n) including, but not limited to, utilities and mercury, and through the National Academy of Sciences' study of EPA's risk assessment methodologies.

Although the provisions described above support the establishment of health and environmental protection objectives which could be used to guide emission standards and other control measures, the authority to use these objectives in legally defensible ways beyond defining the stringency of MACT standards is ambiguous, at best. This is because the section 112 program is predicated on emission standards rather than on ambient, health, or environmental targets. Thus EPA would have to go to extra effort to justify its use of such objectives for purposes other than setting MACT standards. Further statutory analyses by the Office of General Counsel are needed to better define the limits of our authority for this.

Section 112(f) residual risk provisions do not mandate specific goals and objectives, but gives EPA considerable flexibility and discretion (at a minimum, it uses the standard set in the "benzene decision," i.e., a cancer risk to the maximum exposed individual no greater than 1 in one million as a default requirement). It is unclear to what extent, for instance, residual risk authorities and activities could be delegated to States.

Determining Needed Emission Reductions

To determine necessary emission reductions to meet a specified health or environmental objective, the sources emitting those pollutants must first be identified. The various source category listing provisions under section 112© are most relevant and include not only general listing provisions for major source MACT activities, but also more specific efforts, such as the identification of urban area source categories under subsection (c)(3) and the listing of sources of specific pollutants under subsection (c)(6). These efforts are cross-referenced in section 112(k) for urban area sources and are further supported by the section 112(m) Great Waters Program, which is required to identify the sources contributing to transport and deposition of key HAPs of concern.

The establishment of appropriate levels of emissions control is primarily addressed through the standards under section 112(d), according to schedules set forth in section 112(e). Section 112(h) provides for the establishment of alternative standards, especially work practice standards, in appropriate instances. The section 112(m) Great Waters and section 112(k)

Urban Area Source programs are further required to determine what additional standards or controls are needed under the statute (or other laws, in the case of urban area sources) and to ensure that appropriate regulatory action is taken. These efforts can be supported by early efforts under section 112(f) for residual risk where evidence supports the establishment of stricter standards initially.

Section 112(d) is designed to ensure that all major sources of HAPs are well controlled. While there is some legislative history indicating that some members of Congress envisioned a 75% reduction in emissions, there is no explicit target for what overall reduction should be obtained. The Act assumes that all major sources of HAPs require maximum achievable control technology unless EPA can justify removing the source category from the section 112© list. Implicit, however, in the structure of the Act is broad flexibility to EPA in deciding which major source categories should be regulated first. Additionally, the Act is not explicit regarding the determination of which categories should be regulated beyond the minimum (MACT "floor") requirements. To the extent that residual risk and other provisions support the development of health and environmental objectives, these could serve as levels which risk, air quality, or other analyses could be used to define emission control requirements. However, it is unclear from the statute to what extent EPA could use these authorities in geographically-focused ways, as opposed to revising MACT stringency across a source category or subcategory.

Identifying Strategies and Actions to Achieve Reductions

The Act identifies national emission standards as the primary means of achieving needed emission reductions. The Act provides certain additional authorities, e.g., section 112(m)(6) mandate to establish "emission standards and other control measures as may be necessary and appropriate" to address effects from atmospheric deposition. Section 112(k) additionally requires a published strategy and additional control measures under the Act and other statutes as needed to reduce emissions from stationary and area sources to meet a minimum 75% reduction in associated cancer incidence.

Two provisions of the Act, sections 112(g) and 112(j) require States to provide for case-by-case control technology results. Section 112(j) of the Act provides a mechanism under which State and local agencies provide for the needed emission reductions in cases where the EPA has not regulated a source category in a timely manner. Section 112(g) requires that States ensure that newly constructed major sources are well-controlled, and that emission reductions are achieved even if no federal emission standard has been promulgated.

One provision of the Act, section 112(I)(5) is intended to provide an incentive to source owners to provide for early

reductions in emissions by granting a compliance extension when a 90 or 95% control level is achieved.

While a number of strategies and actions are called for in section 112 to reduce emissions, few are explicitly coordinated or cross-referenced within the statute, making it difficult to establish interprogram relationships or to set priorities and levels of stringency among them. Moreover, there is little recognition of the fact that a number of States are currently developing their own risk-based standards at the same time that EPA is developing technology-based standards nationally.

With the exception of section 112(k), where it is implied in the authority to consider other statutory authorities. the Act does not recognize the contributions to air toxics reductions that are made by criteria pollutant control programs, nor does it explicitly recognize that the air toxic emission standards program can provide important reductions in criteria pollutants. While there does not appear to be any barrier to taking advantage of mutually-supportive programs, it is unclear to what extent HAP reductions achieved through criteria control programs can be credited toward statutorily-required actions under section 112.

In urban areas, mobile sources are significant contributors of HAPs and one cannot establish an accurate assessment of exposure risks in urban areas without explicitly considering mobile, area and major stationary source emissions together. Moreover, the lack of a statutory linkage between mobile and stationary sources for overall control strategy purposes fails to consider the possibility that mobile source controls may more cost-effectively reduce exposures in some instances. As with co-control opportunities in the criteria pollutant programs, it is unclear to what extent mobile source HAP reductions can be used to meet section 112 goals.

**Implementing and Enforcing Identified Actions**

The Act, through section 112 and part 70, clearly establishes State and local agencies as having the primary role to implement and enforce the emission reduction measures envisioned by the statute. Implicit in this structure is the need for EPA to work closely with States in establishing and evaluating the emission standards. Section 112(l) recognizes an important role for existing State and local air toxics programs, and implicitly recognizes the need for a smooth interface between the Federal and State/local programs. Unlike section 110, which establishes a set of specific components to be included in State implementation plans for criteria pollutants, however, the Act does not provide any specific criteria for how this is to be accomplished for air toxics, providing only that State programs cannot be less stringent than federal standards. Moreover, EPA's authority to delegate responsibilities for actions such as residual risk standards to States through the 112(l) program approvals is unclear.

**Evaluating Progress and Results**

While section 112 requires EPA to assess and report on the status of EPA and State actions under section 112, there is no explicit program set out to gather and evaluate air quality, emissions, or other relevant information. Several subsections could be read together to form the basis for such a program, but with only limited authority to require information.

Section 112(b), in addition to the listing of HAPs, grants to EPA the authority to prescribe methods for the monitoring of emissions, air quality, atmospheric deposition and bioaccumulation. This authority could be regarded as broader than authorities for criteria pollutant programs in the sense that it permits the establishment of federal reference methods for a broader array of environmental indicators. However, it does not authorize EPA, explicitly, to require the deployment of monitoring networks, as do other portions of the Act for criteria pollutants. Section 112(m) requires EPA to conduct monitoring of transport, deposition and effects of HAPs in the Great Waters, and thus establishes at least a partial basis for a national monitoring network. Section 112(k) also authorizes EPA to conduct monitoring of HAPs in urban areas, although this authority appears more related to initial research activities to identify most critical HAPs. Finally, section 112(s), normally viewed as the basis for EPA's periodic report to Congress on the status of EPA and State actions under section 112, also requires EPA to establish and maintain a database on pollutants and regulated sources. This provision appears to provide the best basis for a broader data collection and analysis effort which is directly related to judging the effectiveness of section 112 programs and activities.

The Act provides only general guidance when it comes to evaluating the results of the air toxics program embodied in section 112. This is in contrast to the criteria pollutant program, for which detailed and explicit requirements are given (monitoring in nonattainment areas, percentage reductions towards reasonable further progress, etc.). The only explicit requirement for progress evaluation in section 112 is the requirement in section 112(s) to maintain a "database on pollutants and sources" and to report periodically to Congress on the status of EPA and State activities. Consequently, there is no clear authority for EPA to require monitoring and reporting by States on emissions, air quality, or other potential indicators which could be used to evaluate program success over time, and the requirement of section 112(s) to maintain a database on sources and HAPs is silent on the nature of our authority to actually collect the information.

**Conclusions**

From the various provisions of s ction 112, one can infer a statutory scheme which is generally supportive of the air toxics

management model and the approach embodied in the strategy. The statutory pieces do not form a "perfect fit," particularly where health and environmental objectives and progress tracking are concerned, but it appears that such a strategy can be implemented without posing clear statutory conflicts or violating the spirit and intent of section 112. Because EPA's authority is significantly more ambiguous and, therefore, more limited in a number of areas for air toxics than it is for criteria pollutants, EPA will be challenged to find defensible ways to implement them which will find support among States and other stakeholders. Effective communications and outreach strategies will thus be critical to success, as will cooperation by the Office of General Counsel in the careful crafting of additional program elements.

# Figure 3. Statutory Relationship to Air Quality Management Model

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## Establish and Consider Objectives

What are the pollutants of concern for Health and environmental effects?

112(b) Listing of HAPs
112(m) Great Waters Study
112(k) Urban Area Source Study

What objectives are needed to protect public health and the environment?

112(f) Residual Risk standards
112(m) Great Waters Study
112(k) Urban Area Source Study
112(n) Utility and Mercury Studies
112(o) NAS Study
112(p) Mickey Leland Ceneter

## What Reductions are Needed?

What are the sources (major, area, mobile)

112(c) Listing of sources
112(m) Great Waters Study

What level of emissions control should be required

112(d) MACT standards
112(e) MACT schedules
112(h) Alternative standards
112(m) Additional standards or controls (Great Waters)
112(k) additional measures under CAA or other laws
112(g) Permits
112(j) Equivalent limits in the absence of MACT

## Implement and Enforce

How should emission standards be implemented and enforced?

112(l) State air toxics programs
112(g) Permits
112(i) MACT compliance schedules

## Evaluate Results

Are actions being implemented and are they protecting health and the environment?

112(b) Monitoring methods for emissions, air quality, deposition and bioaccumulation
112(m) Monitor transport, deposition and effects of HAPs
112(s) Database on pollutants and regulated sources, Report to Congress on EPA and State actions under 112

## APPENDIX D. STRATEGIC MATRIX
## A DETAILED DESCRIPTION OF THE OATS STRATEGY

While creating the OAQPS air toxics strategy, the team developed a matrix as a tool to describe many of the detailed aspects of the strategy. The matrix is the teams interpretation of the basic direction for specific topics currently being worked on in the air toxics program and implies certain policies and activities that are needed to carry out the strategy.

The strategic matrix was based on use of the air toxics management model and a recognition that a number of separate air toxics sub-problems should be addressed by the strategy. In short, the sub-problems included (1) high risk cancer and non cancer effects typically associated with exposures near point sources of HAPs (microscale problems), (2) urban-like situations where large numbers of people are exposed to a variety of HAPs from a number of sources, including mobile sources (urban scale problems), (3) emissions and exposures that affect populations in cross jurisdictional situations, like Hg deposition in the Florida everglades (regional scale problems) and (4) national problems such as total cancer incidence and large scale deposition of bioaccumulative HAPs (National scale). The matrix includes eight sub-problems; the magnitude and nature of these eight separate air toxics sub-problems are discussed in Appendix A to this report.

For each sub-problem, the matrix identifies an integrated strategy that would serve to address that particular sub-problem in a comprehensive manner. As discussed in section II of this report, an air toxics management model was used for this purpose. The air toxics management model involves five separate components that the strategy needed to address:

(1) goals and objectives,

(2) priorities for reductions,

(3) how to achieve the reductions,

(4) implementing and enforcing reduction measures, and

(5) feedback and evaluation.

The strategic matrix provided in this Appendix is intended to illustrate how the strategy described generally in section III of the report can address each of these components for each air toxics sub-problem. The matrix provides the level of detail needed for experts in the field of air toxics, both within OAQPS and beyond, to understand better the policy and resource effects of the strategy. Many efforts are needed to flesh out the details, resource, and work product implications of the strategy. The matrix, although certainly incomplete and imperfect, will provide a useful starting point for these efforts.

In developing the strategic matrix, the team found that it is difficult to learn how to read the matrix. Nevertheless, the matrix does provide a thorough (although not necessarily complete) interpretation of the strategy into practical policies and activities. Thus the team developed the following suggestions for learning how to read the matrix.

. Please look over Figure D-1 before you begin navigating through the strategic (air toxics management model - air toxics problem) matrix. Figure D-1 provides an overview and index to the strategic matrix.

*Look at the rows*

The Rows represent the types of air toxics problem to be solved - the scales and subproblems.

- It is probably most useful to begin by looking ACROSS ONE ROW AT TIME to get an idea as to how the table works. By focusing on a single sub-problem, the reader can get a quick look at the entire strategy for a given sub-problem.

- Each row (identified as rows 1, 2, ... 8) represents a different aspect of air toxics problem.

  + Involve scales, i.e., microscale, urban, regional, and national/global.

  + Identify the subproblems pertinent to a particular scale are identified as SUB-PROBLEM 1, 2, ... 8).

  + Give reader a view of the entire strategy that addresses a given subproblem. For example, what the strategy recommends for urban air toxics problem can be found in Rows 3 and 4.

*Look at the columns*

- The Columns represent the elements of the air toxics management model:

  + The first column indicates the scale/subproblem,

  + The second column identifies the draft Human Health and Environmental (HH&E) goals/objectives selected by the team for the particular scale/subproblem,

  + The third column identifies activities and policies for setting priorities in emission reductions needed to achieve the HH&E goals/objectives,

  + The fourth column identifies activities and policies for achieving the needed emission reductions or program direction,

  + The fifth column identifies activities and policies for implementing the activities established to achieve the needed emission reductions, and

  + The sixth column identifies activities and policies for evaluating the effectiveness of the program for the scale/subproblem.

- The columns give the reader a view of integrated activities and policies being used to address a given element of the air toxics management model. Looking DOWN an INDIVIDUAL COLUMN, the reader can see how a given element of the air toxics management model varies across the different sub-problems. For example, by looking down column G (indicators of progress), the reader can get an idea of the entire set of environmental indicators recommended by the team.

*In summary,*

Each BOX in the table (i.e. and intersection of row and column, A-1, B-1, etc) represents how the strategy would cover an element of the air toxics management model for a given air toxics sub-problem. For example, box 1-A indicates how the strategy would address "goal-setting" for the sub-part of the microscale problem dealing with individual risks that can be quantified.



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Figure D-1 - Overview and Index to Strategic Matrix

| Scale/subproblem | (Column A) Human health and environmental (HH&E) objectives ... | (Column B) How can we identify emission reduction priorities, ... | (Column C) What specific emission reduction measures will be taken ... | (Column D) Implementation Considerations -- ... | (Column E) Evaluate results. ... |
|---|---|---|---|---|---|
| **Subproblem 1:** Microscale Individual risk, quantified | A-1 | B-1 | C-1 | D-1 | E-1 |
| **Subproblem 2:** Microscale Individual risk, not quantified | A-2 | B-2 | C-2 | D-2 | E-2 |
| **Subproblem 3:** Urban Widespread risks due to typical urban sources | A-3 | B-3 | C-3 | D-3 | E-3 |
| **Subproblem 4:** Urban Widespread risks due to clusters of unique sources | A-4 | B-4 | C-4 | D-4 | E-4 |
| **Subproblem 5:** Regional Risk not justifying national solution | A-5 | B-5 | C-5 | D-5 | E-5 |
| **Subproblem 6:** Regional Loading of persis/bioacc. poll. | A-6 | B-6 | C-6 | D-6 | E-6 |
| **Subproblem 7:** National/Global Aggregate population risk | A-7 | B-7 | C-7 | D-7 | E-7 |
| **Subproblem 8:** National/Global Loading of persis./bioacc. poll. | A-8 | B-8 | C-8 | D-8 | E-8 |

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| Scale/subproblem | (Column A)<br><br>HH&E Objectives or process for establishing HH&E Objectives[1] for addressing that sub-problem | (Column B)<br><br>How can we identify emission reduction priorities, that is, the types of reductions that contribute the most towards achieving the goal? | (Column C)<br><br>What specific emission reduction measures will be taken consistent with these emission reduction[1] priorities? | (Column D)<br><br>Implementation considerations -- what activities can help ensure that the reductions are achieved in practice? | (Column E)<br><br>Evaluate results. What indicators will be used to determine whether the implemented measures have achieved the goal? |
|---|---|---|---|---|---|
| **Microscale**<br><br>**Subproblem 1:**<br><br>-- Effects associated with individual risks (including ecological risks) that can be quantified from nearby or contiguous stationary sources and "clusters" of stationary sources | **Box A-1. HH&E Objectives for addressing subproblem 1:**<br><br>Sources meet MACT and then "Benzene decision" test for maximum individual risk (MIR) (10-4). Threshold pollutants -- all < "ample margin of safety." [reference concentrations (RfCs) as appropriate]. Where they exist, use threshold concentrations for eco effects (e.g., water quality criteria).<br><br>Short-term objective: reductions in # of people exposed by reducing emissions and risk for highest priority HAPs.<br><br>Long-term objective: significant reduction in # of locations where individual sources or "clusters" cause this level to be exceeded. | **Box B-1. How to establish priorities for meeting HH&E Objectives in box A-1.**<br><br>To set MACT priorities, use "short list" of high priority HAPs to identify 10-year categories of greatest importance. [Note: strategy assumes all 7-yr categories are a priority, because all emit high-priority pollutants]:<br><br>--Short-term: Focus on categories emitting 1 or more of "short list" of high priority HAPs. To identify, use active data collection by EPA, S/L, sources.<br><br>-- Long term: collect health and environmental effects info to identify pollutants to add to list of highest priority HAPs | **Box C-1. Specific measures consistent with the priorities identified in B-1.**<br><br>Continue to propose and promulgate 7-yr MACT on schedule.<br><br>For 10-yr categories:<br><br>--Source categories >a few sources, develop MACT. Where reasonable go beyond MACT floor through MACT partnerships.<br><br>--For source categories with <a few sources, use partnerships, but State and source operator put finishing touches on MACT determination. State incorporates in Title V permit. Develop this approach through early partnerships with States, industry, and environmentalists. Begin process using appropriate 7-yr and 10-r MACT projects in the near term. | **Box D-1. How to improve implementation of measures identified in C-1.**<br><br>To improve MACT implementation for 2, 4, 7 and 10 yr standards (i.e., to achieve predicted emission reductions):<br>-- Readily implemented stds by continuing to work with states and industry in drafting stds.<br><br>--Amend rules to improve subpart E and title V, thereby achieving better integration with State programs.<br>-- Continue to use enabling/outreach tools. Satellite, TTN, small business assistance, etc<br>-- Target enforcement efforts to categories of greatest risk.<br><br>States implement and enforce. Work with States to establish accountability | **Box E-1. Evaluate whether implemented measures per D-1 are successful.**<br><br>To assess trends:<br><br>Short-term:<br>--Track emissions of the highest priority HAPs. Develop appropriate means to periodically update the inventory in reasonable manner (note: we do not envision national "bottom-up" inventory).<br>-- Consider developing index (e.g., potency X emissions) to give improved picture of emission totals.<br><br>Consider outreach eff rt to gain consensus on trends indicators. Once in place, outreach on results could improve effectiveness |

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| Scale/subproblem | (Column A)<br><br>HH&E Objectives or process for establishing HH&E Objectives[1] for addressing that sub-problem | (Column B)<br><br>How can we identify emission reduction priorities, that is, the types of reductions that contribute the most towards achieving the goal? | (Column C)<br><br>What specific emission reduction measures will be taken consistent with these emission reduction[2] priorities? | (Column D)<br><br>Implementation considerations -- what activities can help ensure that the reductions are achieved in practice? | (Column E)<br><br>Evaluate results. What indicators will be used to determine whether the implemented measures have achieved the goal? |
|---|---|---|---|---|---|
| | | Box B-1 (cont.)<br><br>To set residual risk (RR) priorities. [affects 2,4,7 and 10-yr categories]<br><br>-- Use targeting and risk assessment to identify individual sources and clusters with high MIR after implementation of MACT. (RR applicability limited to high-risk sources or clusters).<br><br>Consider uncertainty in risk assessments when identifying needed reductions | Box C-1 (cont)<br><br>Residual risk(RR): To minimize need for federal RR standards:[3]<br><br>--Short-term: (for both >a few and <a few), provide incentives for operator and State to consider residual risks now.<br><br>-- Longer-term: Provide RR targets, guidance, and assistance for States to address high-risk sources. Provide criteria that, if met, would obviate need for national RR std.<br><br>Long-term: As needed, develop residual risk standards through partnerships. | Box D-1 (cont)<br><br>To reach objective that states/sources deal with RR where possible, outreach program will probably be needed.<br>Ideally, want States summaries of residual emissions and risk info. also, States identifies "clusters." | Box E-1 (cont)<br><br>Long-term:<br>-- Use risk screening, risk assessments, and/or other means to track # of sources with risks above MIR target of 10-4.<br>-- Develop Risk Map |

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| Scale/subproblem | (Column A)<br><br>HH&E Objectives or process for establishing HH&E Objectives[1] for addressing that sub-problem | (Column B)<br><br>How can we identify emission reduction priorities, that is, the types of reductions that contribute the most towards achieving the goal? | (Column C)<br><br>What specific emission reduction measures will be taken consistent with these emission reduction[2] priorities? | (Column D)<br><br>Implementation considerations -- what activities can help ensure that the reductions are achieved in practice? | (Column E)<br><br>Evaluate results. What indicators will be used to determine whether the implemented measures have achieved the goal? |
|---|---|---|---|---|---|
| | | Box B-1 (cont)<br><br>To ensure an appropriate degree of regulation for threshold pollutants, regulate to ensure emissions cause concentrations below an "ample margin of safety" level<br><br>Identify source categories with only threshold HAPs. Develop approaches to use Section 112(d)(4). Based on consensus target and methodology, identify where 112(d)(4) can be used to identify over or under-regulation. | Box C -1 (cont)<br><br>Consider 112(d)(4) in decision on MACT stringency, or whether MACT should be required.<br><br>Consider 112(d)(4) in decision whether to list area sources under urban program | Box D-1 (cont)<br><br>Implement through partnerships. | Box E-1 (cont)<br><br>Survey major stakeholders and determine satisfaction with this program element. |
| | | Box B-1 (cont)<br><br>To ensure that program does not address "non-problems:"<br><br>-- Identify/delist categories with no major sources and no connection to urban or effects due to persistence or bioaccumulation.<br><br>Identify and delist categories (or HAPs) posing no human health or environmental harm . | Box C -1 (cont)<br><br>Develop internal procedures for HAP and category delisting efforts. Include in these procedures a process to involve MACT partners in decision to delist. | Box D-1 (cont)<br><br>Implement through partnerships. | Box E-1 (cont)<br><br>Survey major stakeholders and determine satisfaction with this program element. |

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| Scale/subpr blem | (Column A)<br><br>HH&E Objectives or process for establishing HH&E Objectives[1] for addressing that sub-problem | (Column B)<br><br>How can we identify emission reduction priorities, that is, the types of reductions that contribute the most towards achieving the goal? | (Column C)<br><br>What specific emission reduction measures will be taken consistent with these emission reduction[2] priorities? | (Column D)<br><br>Implementation considerations -- what activities can help ensure that the reductions are achieved in practice? | (Column E)<br><br>Evaluate results. What indicators will be used to determine whether the implemented measures have achieved the goal? |
|---|---|---|---|---|---|
| Microscale<br><br>Subproblem 2:<br><br>-- Qualitative effects associated with maximum exposed individuals that cannot be quantified due to lack of health, emissions or other information | Box A-2. HH&E Objectives for addressing subproblem 2:<br><br>Reasonable reductions in emissions based upon consensus agreements with stakeholders.<br><br>Long-term: Add health and eco benchmarks. Active effort to develop RfCs. Moderate effort to collect and interpret health data | Box B-2. How to establish priorities for meeting HH&E Objectives in box A-2.<br><br>Short-term: Identify categories without any of the highest priority HAPs, and with qualitative basis for regulating (E g , large volume of toxic HAP for which health effects cannot be quantified)<br><br>EPA collects information to develop qualitative estimates for health benchmarks. | Box C-2. Specific measures consistent with the priorities identified in B-2.<br><br>Where there is a qualitative basis for addressing risks/exposures, develop MACT through MACT partnerships.<br><br>Where this is not a qualitative basis for regulating, EPA would support State action on an as-needed basis. | Box D-2. How to improve implementation of measures identified in C-2.<br><br>[see Box D-1 -- same as for MACT implementation] | Box E-2. Evaluate whether implemented measures per D-2 are successful.<br><br>[see Box E-1 -- same as for MACT evaluation except may need to reduce evaluation given lack of qualitative health basis ] |

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| Scale/subproblem | (Column A)<br><br>HH&E Objectives or process for establishing HH&E Objectives[1] for addressing that sub-problem | (Column B)<br><br>How can we identify emission reduction priorities, that is, the types of reductions that contribute the most towards achieving the goal? | (Column C)<br><br>What specific emission reduction measures will be taken consistent with these emission reduction[2] priorities? | (Column D)<br><br>Implementation considerations -- what activities can help ensure that the reductions are achieved in practice? | (Column E)<br><br>Evaluate results. What indicators will be used to determine whether the implemented measures have achieved the goal? |
|---|---|---|---|---|---|
| Urban<br><br>Subproblem 3:<br><br>-- Widespread risks due to sources typically found in urban areas (4) | Box A-3. HH&E Objectives for addressing subproblem 3:<br><br>Statutory goal of 75% reduction in incidence from stationary sources relative to 1990 baseline. Consider cancer and, to extent possible, consider noncancer effects.[4] | Box B-3. How to establish priorities for meeting HH &E Objectives in box A-3.<br><br>Identify major and area sources of HAPs on the original source category list that contribute to reductions in the HAPs being evaluated under section 112(k).<br><br>Conduct urban risk study, including stationary/mobile. If warranted based upon this study, add categories to source category list, per 112(k) and 112(c)(3) Likely categories emitting one of the specific urban HAPs. Identify mobile sources contributing significantly to the problem. Identify pollutants beyond the specific urban HAPs that contribute significantly to the problem.[55] | Box C-3. Specific measures consistent with the priorities identified in B-3.<br><br>MACT:<br>--Short-term: For currently listed categories, develop MACT, where reasonable go beyond MACT floor, through MACT partnerships.<br>-- Long-term: develop MACT for additional categories added per urban risk study. Consider standards beyond MACT floor, through MACT partnerships.<br><br>Mobile sources:<br>-- Long-term: develop appropriate mobile source regs.<br><br>Co-control of HAPs by VOC and PM SIP programs:<br>-- Short-term: Inform and encourage States to describe HAP implications of SIP actions for VOC and PM.<br>-- Long-term: Develop additional info on HAP characteristics of VOC and PM, and alternative technologies for co-control<br><br>Market-based: dialogue on | Box D-3. How to improve implementation of measures identified in C-3.<br><br>Readily implemented standards; improved subpart E/Title V.<br><br>Partnership between HAP and criteria program: bring discussion forward through an effective process. | Box E-3. Evaluate whether implemented measures per D-3 are successful.<br><br>Trends: Short-term efforts:<br>-- Identify available ambient monitoring data for specific urban HAPs. Develop system for cooperating with states on inexpensively yet regularly updating this information.<br>-- Develop PSI indicator for urban monitoring trends for the specific urban pollutants<br>-- Use urban study to devise a method aimed at providing progress report on the 75% target.<br>-- Track emission inventories for the specific urban pollutants.<br><br>Trends: long-term efforts:<br>--add pollutants and monitoring sites as info is available.<br>-- If surrogate for the 75% target emerges, |

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| Scale/subproblem | (Column A)<br><br>HH&E Objectives or process for establishing HH&E Objectives[1] for addressing that sub-problem | (Column B)<br><br>How can we identify emission reduction priorities, that is, the types of reductions that contribute the most towards achieving the goal? | (Column C)<br><br>What specific emission reduction measures will be taken consistent with these emission reduction[2] priorities? | (Column D)<br><br>Implementation considerations -- what activities can help ensure that the reductions are achieved in practice? | (Column E)<br><br>Evaluate results. What indicators will be used to determine whether the implemented measures have achieved the goal? |
|---|---|---|---|---|---|
| Urban<br><br>Subproblem 4:<br><br>-- Widespread risks in populated areas due to contributions from stationary source 'clusters' that are unique to a given area (5) | Box A-4. HH&E Objectives for addressing subproblem 4:<br><br>Reduce population exposure to "cluster" pollutants | Box B-4. How to establish priorities for meeting HH &E Objectives in box A-4.<br><br>Short-term conduct a study to identify such "clusters" to see if any additional emission reduction measures are needed later. To support this, data collection for the highest priority HAPs and specific urban HAPs. Initiate active data collection by EPA, S/L, & Sources of emission patterns. Follow up with risk assessment as appropriate to evaluate significance of clusters to area wide concentrations.[66] | Box C-4. Specific measures consistent with the priorities identified in B-4.<br><br>MACT:<br>--No active efforts to consider clusters in MACT development. Consider in response to request.<br><br>--Include as consideration in MACT development where needed.<br><br>Discuss with States the need for guidance document and assistance for addressing this issue. | Box D-4. How to improve implementation of measures identified in C-4. | Box E-4. Evaluate whether implemented measures per D-4 are successful.<br><br>Trends - Short-term: no active consideration of this in trends reporting.<br><br>-Long-term: Develop process to include in trends report if documented that these problems exist. |

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| Scale/subproblem | (Column A)<br><br>HH&E Objectives or process for establishing HH&E Objectives[3] for addressing that sub-problem | (Column B)<br><br>How can we identify emission reduction priorities, that is, the types of reductions that contribute the most towards achieving the goal? | (Column C)<br><br>What specific emission reduction measures will be taken consistent with these emission reduction[4] priorities? | (Column D)<br><br>Implementation considerations – what activities can help ensure that the reductions are achieved in practice? | (Column E)<br><br>Evaluate results. What indicators will be used to determine whether the implemented measures have achieved the goal? |
|---|---|---|---|---|---|
| Regional<br><br>Subproblem 5:<br><br>– Risk caused by transport within a broader "region" with multiple jurisdictions, not widespread enough to justify national solutions. (6) | Box A-5. HH&E Objectives for addressing subproblem 5.<br><br>[see above discussion of issues for urban risk HH&E Objectives] | Box B-5. How to establish priorities for meeting HH&E Objectives in box A-5.<br><br>Long-term: identify any such transport regions. Guidance to States and Regional Associations for considering such situations. | Box C-5. Specific measures consistent with the priorities identified in B-5.<br><br>Long-term: use transport studies as basis to list additional MACT within urban air toxics program as needed.<br><br>Encourage and facilitate multi-State planning and control initiatives. | Box D-5. How to improve implementation of measures identified in C-5.<br><br>Outreach to States and public | Box E-5. Evaluate whether implemented measures per D-5 are successful.<br><br>Trends: regional emissions, ambient monitoring for any such identified regions |

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| Scale/subproblem | (Column A)<br><br>HH&E Objectives or process for establishing HH&E Objectives' for addressing that sub-problem | (Column B)<br><br>How can we identify emission reduction priorities, that is, the types of reductions that contribute the most towards achieving the goal? | (Column C)<br><br>What specific emission reduction measures will be taken consistent with these emission reduction' priorities? | (Column D)<br><br>Implementation considerations -- what activities can help ensure that the reductions are achieved in practice? | (Column E)<br><br>Evaluate results. What indicators will be used to determine whether the implemented measures have achieved the goal? |
|---|---|---|---|---|---|
| **Regional**<br><br>**Subproblem 6:**<br><br>-- Regional loadings to environment of persistent or bioaccumulable pollutants (7) | **Box A-6. HH&E Objectives for addressing subproblem 6.**<br><br>Reduce deposition to levels that do not contribute significantly to exceedances of RfDs or other measures of harm from such pollutants.<br><br>*Add quantitative HH&E Objectives later based upon peer review/SAB process for mercury.* | **Box B-6. How to establish priorities for meeting HH&E Objectives in box A-6.**<br><br>Reasonable reductions in ecosystem loadings as result of partnership process involving stakeholders, including SAB process<br><br>Complete 112(c)(6) study to identify additional categories.<br><br>Long-term: Continue special study efforts, Great Waters etc. [Focus GW efforts on specific list of HAPs.] Use results to identify categories of pollutants in addition to the 112(c)(6) pollutants, or to identify categories that have been overlooked. | **Box C-6. Specific measures consistent with the priorities identified in B-6.**<br><br>MACT:<br>Short-term: Focus on 112(c)(6) categories. Develop MACT if needed or appropriate alternative measures; go beyond floor where reasonable.<br>Long-term: Set appropriate alternative measures in residual risk process.<br><br>Participate in mercury task force aimed at discussing emissions "cap" and other concepts. | **Box D-6. How to improve implementation of *measures identified* in C-6.**<br><br>Consider extra effort to ensure compliance with MACTs reducing emissions of bioaccumulating pollutants | **Box E-6. Evaluate whether implemented measures per D-6 are *successful.***<br><br>TRENDS:<br>**Regional inventories, updated on a regular bases every few years, for key pollutants, with assistance from States in the region.** |

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| Scale/subproblem | (Column A)<br><br>HH&E Objectives or process for establishing HH&E Objectives[7] for addressing that sub-problem | (Column B)<br><br>How can we identify emission reduction priorities, that is, the types of reductions that contribute the most towards achieving the goal? | (Column C)<br><br>What specific emission reduction measures will be taken consistent with these emission reduction[8] priorities? | (Column D)<br><br>Implementation considerations – what activities can help ensure that the reductions are achieved in practice? | (Column E)<br><br>Evaluate results. What indicators will be used to determine whether the implemented measures have achieved the goal? |
|---|---|---|---|---|---|
| National/Global<br><br>**Subproblem 7:**<br><br>– Aggregate population risk (incidence) (6) | Box A-7. HH&E Objectives for addressing subproblem 7:<br><br>Primary objectives:<br>Reduce number of people exposed to MIR above 10-6, and exposed above RfCs, RfDs, and exposed to HAPs in general (where cannot quantify)<br><br>Secondary objectives<br><br>– Reduce total nationwide emissions of HAPs by 75%.<br><br>– Develop an index that can provide clearer picture of emission totals [where quantification is possible].<br><br>– Develop better measures to characterize reductions of HAPs where problem is not quantifiable. | Box B-7. How to establish priorities for meeting HH&E Objectives in box A-7.<br><br>Identify widespread, high-emitting categories emitting one or more of the highest priority HAPs. For these, develop data base to consider incidence calculations in the residual risk evaluation process.<br><br>Identify widespread, high-emitting categories emitting HAPs not on the list of highest priority HAPs; typically these will be sources of large VOC or PM emissions | Box C-7. Specific measures consistent with the priorities identified in B-7.<br><br>Follow MACT perhaps more MACT floor; include incidence in residual risk process. Note: cross-check micro- and urban-scale applicability- no extra effort may be required here. | Box D-7. How to improve implementation of measures identified in C-7. | Box E-7. Evaluate whether implemented measures per D-7 are successful.<br><br>Trends: Track total HAP emissions, taking into account mobile and non-TRI emission sources. Consider developing index (e.g., emissions X potency).<br><br>To support this, data collection for highest priority HAPs and specific urban HAPs, and additional HAPs that with large emission rates. Active data collection by EPA, S/L, & Sources. |

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| Scale/subproblem | (Column A)<br><br>HH&E Objectives or process for establishing HH&E Objectives' for addressing that sub-problem | (Column B)<br><br>How can we identify emission reduction priorities, that is, the types of reductions that contribute the most towards achieving the goal? | (Column C)<br><br>What specific emission reduction measures will be taken consistent with these emission reduction* priorities? | (Column D)<br><br>Implementation considerations -- what activities can help ensure that the reductions are achieved in practice? | (Column E)<br><br>Evaluate results. What indicators will be used to determine whether the implemented measures have achieved the goal? |
|---|---|---|---|---|---|
| National (cont)<br><br>Subproblem 8:<br><br>-- National loadings to environment of persistent or bioaccumulable pollutants. [This sub-problem is very similar to "regional" above except that involves situations where national reductions are needed to solve the problem]<br>(9) | Box A-8. HH&E Objectives for addressing subproblem 8:<br><br>Reduce deposition to levels that do not contribute significantly to exceedances of RfDs or other measures of harm from such pollutants.<br><br>Add HH&E Objectives later based upon peer review/SAB process for mercury. | Box B-8. How to establish priorities for meeting HH&E Objectives in box A-8.<br><br>Reasonable reductions in national ecosystem loadings as result of partnership process involving stakeholders, including SAB process.<br><br>Complete 112(c)(6) study to identify additional categories.<br><br>Continue special study efforts, Great Waters etc. Use results to identify categories of pollutants in addition to the 112(c)(6) pollutants, or to identify categories that have been overlooked. | Box C-8. Specific measures consistent with the priorities identified in B-8.<br><br>MACT:<br>Short-term: Focus on 112(c)(6) categories. Develop MACT if needed or appropriate alternative measures; go beyond floor where reasonable.<br>Long-term: Set appropriate alternative measures under Section 112(m)(6).<br><br>Participate in mercury task force aimed at discussing emissions "cap" and other concepts. | Box D-8. How to improve implementation of measures identified in C-8.<br><br>Consider extra effort to ensure compliance with MACTs reducing emissions of bioaccumulating pollutants | Box E-8. Evaluate whether implemented measures per D-8 are successful.<br><br>TRENDS:<br>National inventories, updated on a regular bases every few years, for key pollutants, with assistance from States. |

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1. An issue for long-term strategy development is whether there should be a process to gain consensus on an improved set of human health and environmental goals for air toxics. Such a process, while resource-intensive, could serve to help focus efforts in the most productive direction.

2. Although the focus on this column is largely on regulatory tools, comments are welcome on nonregulatory approaches, and how they could be used to complement and improve the approaches described. With respect to regulatory and nonregulatory approaches, successful completion of the activities in this column depends on resolving the collective interest of all stakeholders. Thus, the partnership concept is core to all the approaches. The ability to fulfill these partnerships is greatly enhanced with additional resources.

3. One approach to minimizing the need for federal residual risk standards be to create a program similar in concept to the California "hot spots" approach. Such a program would provide a method to screen out low-risk sources, and would involve risk assessments by sources and/or States. This approach would require extra resources in the near term but would significantly reduce resources and efforts in the future.

4. It may be useful to complement the statutory target with specific ambient concentration targets for the highest priority urban HAPs. If feasible, this may involve a consensus effort to devise targets. There may be advantages to express such levels as informal environmental goals rather than specific regulatory targets.

5. A long-term strategic issue is whether to recommend a concentrated effort with greater targeting/outreach/indicator- tracking efforts on a relatively few pollutants that appear at present to be the greatest contributors to the urban problem, or to devote less concentrated attention to a larger list of pollutants (e.g., a list of 30 as called for in 112(k).

6. If such regional clusters exist (i.e. areas having noticeably higher area wide concentrations due to an unusually high concentration of stationary source emissions), it may be appropriate for the EPA to develop targeted geographic assistance programs, similar to the Integrated Environmental Management programs conducted during the mid 1980s.

7. An issue for long-term strategy development is whether there should be a process to gain consensus on an improved set of human health and environmental goals for air toxics. Such a process, while resource-intensive, could serve to help focus efforts in the most productive direction.

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## APPENDIX E. DISCUSSION OF ISSUES RELATING TO DATA NEEDS FOR TRACKING PROGRESS

### 1. Toxic Release Inventory Data Issues

The Toxic Release Inventory (TRI) does not present a complete picture of HAP emissions in the United States. TRI collects data from point sources and does not include area or mobile sources emissions. According to our most recent estimates, area and mobile sources contribute approximately 70% of HAP emissions annually. In addition, the point source HAP emissions reported in TRI do not comprise all point source categories. The OAQPS National Toxics Inventory (NTI) currently reports that, of the 2.6 billion pounds of HAPs emitted by point source facilities nationwide, less than 50% of these point source emissions are reported in TRI. Factors contributing to the under-representation of data in TRI are:

* Emissions from small point facilities as well as commercial, residential, area and mobile sources are not included in TRI.

* TRI collects data from a subset of industrial point sources having Standard Industrial Classification Codes 20 - 39. Under this exemption, facilities such as mining operations, electric utilities, and oil and gas production are not required to report HAP emissions to the TRI.

* TRI excludes combustion emissions from sources required to report to the TRI.

* Sources with <10 employees are exempt from reporting to the TRI.

* TRI excludes facilities that use <10,000 lbs or produce <25,000 lbs of listed HAPs from reporting requirements. From a health impact, OAQPS is interested in releases of small quantities of some HAPs. These emissions would likely not be reported in TRI.

The result of all these factors combined is that the coverage of the TRI is less than 15% of the total annual HAP emissions that contribute to air toxic problems across the United States.

In spite of the deficiencies of the TRI noted above, the TRI remains useful tool for both analytical and regulatory purposes. It should be noted that the quality of HAP emission estimates have improved in TRI since its first annual release in 1987. For the specific sources included, these estimates are believed to be better than estimates generated using typical emission factor calculations. Therefore, the OAQPS National Toxics Inventory does use data compiled in TRI in addition to other data sources such as State & Local HAP inventories, data gathered by OAQPS to support MACT development, and HAP estimates generated by OAQPS.

TRI has also been used as a "voluntary" tool in reducing HAP emissions. Since facilities do not want to be at the top of the TRI list, many have voluntarily reduced HAP emissions.

**2. A Possible "Pollutant Standards Index" Approach to the Air Toxics Problem**

The relative success of the Pollutant Standards Index (PSI) in communicating the severity of criteria air pollutant problems in metropolitan areas suggests that an adaptation of the PSI approach may be useful in implementing the air toxics program. The current criteria pollutant PSI is an index calculated daily from air quality monitoring data which indicates the relative level of air pollution in that area based on the "worst" criteria pollutant on that day, where "worst" is defined as that pollutant whose measured concentration represents the highest percent of its standard value (as defined by a National Ambient Air Quality Standard, or NAAQS). Obviously, since the EPA has not defined NAAQS values for any air toxic pollutant, this approach will need modifications if it can be useful for the air toxics program. Further, since the majority of air toxics are hazardous based on chronic exposures rather than acute, daily PSI calculations may not have as much meaning as yearly updates. Finally, the ambient measurement of 189 air toxic pollutants will neither be nationally feasible nor locally routine in the near future, and this will need to be reflected in the adapted PSI approach.

It seems likely that a useful PSI for air toxics would involve the development of an annual data summary which took advantage of available monitoring data, emissions inventory information, modeling results, and health studies to present a combined view of the area-by-area severity of the air toxic problem, identifying significant individual HAP and sources, as well as any progress that may have been achieved in reducing th problem over the previous year or years. To promote national consistency, OAQPS should develop national assessments which build off of the current air toxics emission inventory to identify both microscale and urban-scale "hot spots," and the specific pollutants most responsible for them. Existing ambient monitoring-based assessments should then be mapped onto this national emission-based assessment to refine and calibrate the overall assessment, resulting in a more accurate national problem assessment and the ability to extrapolate city-specific assessments from one urban area to another. It can also be used identify whether particular pollutants or sources pose a local, regional, or national problem. The actual PSI-type indicator (or indicators) used for these assessments should combine the existing information in the most logical fashion to provide numerical values which can be ranked much like comparative risk or exposure numbers. The actual numbers could then be reported as numbers, ranges, or even as qualitative ranges (high-medium-low). One possible approach for the treatment of ambient data has been outlined in "An Examination of Alternative Air Quality

Indicators to Better Understand Global Pollution," by William F. Hunt, Jr. (1991). Other approaches for combining emissions, modeling, and health information should be developed by a cross-divisional team in collaboration with State and Local Agencies.

The final step of implementing a PSI-type approach is to provide guidance to the individual metropolitan (and potentially, non-metropolitan) areas on how they can perform their own annual assessments to parallel the national one. This can be accomplished by providing them with the national assessment as an example and encouraging them as environmental partners to collect the data necessary to best evaluate their own particular mix of air toxics problems. As a part of this effort, OAQPS should also support a common database (such as AIRS) to consolidate information feeding into the PSI process.