

September 10, 1997

EPA-SAB-EC-97-007

Honorable Carol M. Browner  
Administrator  
U.S. Environmental Protection Agency  
401 M Street, SW  
Washington, DC 20460

RE: Science Advisory Board (SAB) Review of the "*Environmental Goals for America: With Milestones for 2005*"

Dear Ms. Browner:

I am pleased to send you the Science Advisory Board's comments on the December 1996 draft of the "*Environmental Goals for America: With Milestones for 2005*" (EPA, 1996). As you know this document was prepared as part of the Clinton Administration's regulatory reinvention efforts, and to help satisfy a requirement of the 1993 Government Performance and Results Act. The purpose of the document is to stimulate public discussion of what Americans are seeking to accomplish in environmental protection and what they are willing to pay for such protection.

The document was reviewed by a subcommittee of the Executive Committee during two public teleconferences held April 17, and July 3, 1997. Overall, the document is well written and instructive. In general, the subcommittee considers the draft Goals document to be quite successful, and well-suited to its intended task. The milestones are reasonable surrogates for the environmental improvements desired by society, and they are defined by quantitative information that can be measured with reasonable accuracy (or at least precision).

The subcommittee appreciates the "generality" of the presentation and compliments the Agency for publicly identifying goals across the diverse sets of environmental legislation. The subcommittee also believes the document should stimulate public discussion of what Americans are seeking to accomplish in environmental protection and what they are willing to pay for such protection. The idea of setting goals and measuring progress is good and the Agency is to be commended for submitting the document for review before it is finalized.

While the SAB review comments are generally supportive of the Goals and Milestones guidelines, numerous suggestions for improvement are offered on each. The body of the attached report contains general comments about the Goals document. More specific comments about each goal and milestone are placed in the appendix. The major concern is that the goals and milestones may be overly ambitious with respect to the availability of resources and technologies required to reach them, and because they call for a level of Federal interagency, state, and stakeholder involvement and cooperation that is well beyond what has previously occurred for environmental protection.

There is also concern that the goals and milestones identified in this document lack sufficient specificity to be judged as to their attainability by the year 2005. The subcommittee felt that EPA should more explicitly state that the goals rely on 'cooperation' with non-Federal entities. For many of the milestones it is likely that most of what needs to be done does not come under EPA's mandate. If the Goals document is truly a document for the nation, and not just for the EPA, then the Federal government as a whole needs a strategy for how to proceed to insure attainment of the milestones.

The structure of the draft Goals report, which is centered on the current program office- or media-specific issues, presents difficulties in recognizing and addressing cross-cutting issues. EPA may wish to consider a meta-structure for the report, with three main sections within the Goals document: a) environmental goals relating to human health; b) environmental goals relating to ecological health; and c) environmental goals relating to quality of life issues.

Even though the Goals document contains a number of references to the need for improved scientific understanding, the committee believes that it also needs a specific goal to develop an improved set of institutions and mechanisms that will assure the nation will develop the fundamental scientific understanding that it will need to make future environmental decisions.

The committee applauds the inclusion of the goal on empowering people with information and education and expanding their right to know. In elaborating the specifics of this general goal, more attention needs to be given to the objective of improving public understanding of the scientific bases of environmental decision making through education and outreach.

In addition to the focus on reducing chemical pollution, the Goals document should put more emphasis on the physical and biological stressors affecting the environment. The SAB "Reducing Risk" report (SAB, 1990) and other comparative risk studies have indicated the highest risks to ecological systems are from physical stressors such as habitat alteration and hydrologic modifications. The Goals document should be consistent with this increased recognition of the importance of non-chemical stressors in the environment.

We look forward to your response to these comments.

Sincerely,

/signed/

Dr. Genevieve Matanoski, Chair  
SAB Executive Committee

## **NOTICE**

This report has been written as a part of the activities of the Science Advisory Board, a public advisory group providing extramural scientific information and advice to the Administrator and other officials of the Environmental Protection Agency. The Board is structured to provide balanced, expert assessment of scientific matters relating to problems facing the Agency. This report has not been reviewed for approval by the Agency and, therefore, the contents of this report do not necessarily represent the views and policies of the Environmental Protection Agency, nor of other agencies in the Executive Branch of the Federal government, nor does mention of trade names or commercial products constitute a recommendation for use.

## ABSTRACT

A subcommittee of the Executive Committee reviewed the Agency's report "*Environmental Goals for America: With Milestones for 2005*" through teleconferences held April 17, and July 3, 1997. The charge was: a) do the proposed measures use the most reliable national-level data currently available or likely to become available; b) are there issues of science related to these goals and milestones that ought to be better explained or of which EPA ought to be made aware?

The subcommittee considered the draft Goals document to be quite successful, and well-suited to its intended task. However, it felt that some goals and milestones lacked sufficient specificity to be judged as to their attainability by the year 2005. To better address cross-cutting issues it recommended that EPA consider a meta-structure for the report, with three main sections within the Goals document: i) environmental goals relating to human health; ii) environmental goals relating to ecological health; and iii) environmental goals relating to quality of life issues. The subcommittee applauded the inclusion of the Goal on empowering people with information and education and expanding their right to know, but felt that more attention needs to be given to the objective of improving public understanding of the scientific bases of environmental decision-making through education and outreach. In addition to the focus on reducing chemical pollution, the subcommittee felt that the Goals document should put more emphasis on the physical and biological stressors affecting the environment.

**U.S. ENVIRONMENTAL PROTECTION AGENCY  
SCIENCE ADVISORY BOARD  
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**STAFF SECRETARY**

Mrs. Priscilla Y. Tillery-Gadson, Environmental Protection Agency, Science Advisory Board (1400), U.S. Environmental Protection Agency, Washington, DC 20460

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# 1. EXECUTIVE SUMMARY

The Environmental Goals Subcommittee of the Executive Committee of the Science Advisory Board, hereafter referred to as the Committee, was established to review a draft of the report "Environmental Goals for America: With Milestones for the Year 2005" (EPA, 1996). EPA asked the Committee to conduct a broad brushstroke review of "*Environmental Goals for America: With Milestones for 2005*". Given that the goals are policy based, and that the Agency took a broad brush stroke approach developing the goals, the Committee focused on the use of science, in general, to inform the goal-setting process. The Committee's broad, general comments about the Goals document are presented in the body of this report. More specific comments about each goal and milestone are placed in the appendix.

The charge to the Committee was:

- a) Do the proposed measures use the most reliable national-level data currently available or likely to become available? Are there better measures available to gauge progress towards the goals? One place where we would particularly like your help is on the milestones and measures for the Healthy Terrestrial Ecosystems goal.
- b) Are there issues of science related to these goals and milestones that ought to be better explained or of which EPA ought to be made aware?

Overall, the Committee found the document to be well written and instructive. In general, the Committee considers the draft Goals document to be quite successful, and, all things considered, well-suited to its intended task. The milestones are reasonable surrogates for the real environmental improvements that are truly desired by society, and they are defined by quantitative information that can be measured with reasonable accuracy (or at least precision).

The Committee appreciates the "generality" of the presentation and compliments the Agency for publicly identifying goals across the diverse sets of environmental legislation. The Committee believes the document should stimulate public discussion of what Americans are seeking to accomplish in environmental protection and what they are willing to pay for such protection. The idea of setting goals and measuring progress is good and the Agency is to be commended for submitting the document for review before it is finalized.

There is a general concern that the goals and milestones may be overly ambitious with respect to the availability of resources and technologies required to reach them, and because they call for a level of Federal interagency, state, and

stakeholder involvement and cooperation that is well beyond what has previously occurred for environmental protection. Nonetheless, it would be hard to claim that any one of the goals in the document is unworthy.

There is also concern that the goals and milestones identified in this document lack sufficient specificity to be judged as to their attainability by the year 2005. In addition, there are no intermediate-level options presented, and there is no sense of what steps the Agency will take (e.g., budget) to maintain progress on each of the milestones. How are priorities to be set across milestones if it becomes apparent that all will not be achieved given the resources available for implementation?

It should be made more explicit that the goals stated rely on 'cooperation' with non-Federal entities. For many of the milestones it is likely that most of what needs to be done does not come under EPA's mandate. If the Goals document is truly a document for the nation, and not just for the EPA, then the Federal government as a whole needs a strategy for how to proceed to insure attainment of the milestones.

The structure of the draft Goals report, which is centered on the current program office- or media-specific issues, presents difficulties in recognizing and addressing cross-cutting issues. EPA may wish to consider a meta-structure for the report, with three main sections within the Goals document: a) environmental goals relating to human health; b) environmental goals relating to ecological health; and c) environmental goals relating to quality of life issues. For example, the ecological section would have as its primary focus the preservation, restoration, and sustainability of a diverse set of ecological systems, including various types of terrestrial, wetland, freshwater, estuarine, and marine ecosystems.

Solid scientific understanding is a prerequisite to sound decision making. While the Goals document contains a number of references to the need for improved scientific understanding, the committee believes that it also needs a specific goal to develop an improved set of institutions and mechanisms that will assure the nation will develop the fundamental scientific understanding that it will need to make future environmental decisions.

The committee applauds the inclusion of the goal on empowering people with information and education and expanding their right to know. In elaborating the specifics of this general goal, more attention needs to be given to the objective of improving public understanding of the scientific bases of environmental decision making through education and outreach.

A major hope for the Goals document is the promise of an improved capability to characterize environmental risks, understand how most effectively to allocate resources across risk-reduction measures, and how to anticipate risks of the future.

Establishment of effective databases through existing or new monitoring, greatly improved integration of diverse sources of information, and scientific analyses of the data would provide time-trends and measures of success of the environmental milestones and goals.

In addition to the focus on reducing chemical pollution, the Goals document should put more emphasis on the physical and biological stressors affecting the environment. The SAB "Reducing Risk" report (SAB, 1990) and other comparative risk studies have indicated the highest risks to ecological systems are from physical stressors such as habitat alteration and hydrologic modifications. The Goals document should be consistent with this increased recognition of the importance of non-chemical stressors in the environment. Many wetlands and other freshwater systems have been affected by or are at greater risk from these stressors than by exposures to chemical pollution.

## 2. INTRODUCTION

The *Environmental Goals for America* is the Environmental Protection Agency's (EPA) first attempt to propose long-range national environmental goals to improve the personal health of people living in the United States, the national economy and environment, and the quality of life. EPA believes the goals are achievable with current laws and policies, and the Agency would like to use them to improve the public understanding and discussion of environmental problems, policies, and programs. The Agency also hopes that the goals will be useful as a starting point for planning and accountability, both at EPA and in the Agency's work with the states and with local communities.

In its request that the Science Advisory Board review a draft of the "Goals" document, the Agency asked the Board to keep "in mind (a) the purposes for which the document is intended, ... the fact that it does not create any new requirements, and (b) the fact that this document is necessarily summary in nature and is not intended to explain scientific issues in depth...". In this spirit, the Committee has conducted a general review. The focus of the Committee's comments is not on the policy-related aspects of the goals and milestones, but on how science can best be used to inform the goal-setting process. These broad, general comments about the document are presented in the body of the report, while more specific comments about each goal and milestone are placed in the appendix.

### 2.1 Background

As part of the Clinton Administration's regulatory reinvention efforts, and to help satisfy a requirement of the 1993 Government Performance and Results Act of 1993, the EPA has drafted environmental goals to stimulate public discussion of what Americans are seeking to accomplish in environmental protection and what they are willing to pay for such protection. The intent of the goals document is to help the nation answer such important questions as:

- a) What tangible results should our national environmental programs aim to deliver?
- b) What investments should be made by Federal, state, tribal, and local governments, industry, and others to achieve the nation's environmental goals?
- c) How can regulatory reinvention, flexibility, and innovation be encouraged in working towards the goals?

- d) What environmental progress are we really making?

EPA has been developing these goals over the past four years. They cover nearly all the major environmental issues and build on the Agency's 1987 *Unfinished Business: A Comparative Assessment of Environmental Problems* (EPA, 1987) and the SAB's 1990 report *Reducing Risk: Setting Priorities and Strategies for Environmental Protection* (SAB, 1990). The Goals document lays out 12 goals, and, for each goal the report:

- a) Summarizes what has been done to meet the goal and what is left undone;
- b) Identifies what party(ies) is responsible to meet the challenge;
- c) Proposes milestones or environmental indicators that can be used to track progress towards meeting the goal; and
- d) Describes a strategy to obtain the goal.

The Committee is commenting on the December 1996 draft of the "*Environmental Goals for America: With Milestones for 2005*" (EPA, 1996) as part of a government (Federal, state, and local) review. EPA has stated that it will use these comments to shape the document further before sending it out for public review.

## 2.2 Charge

EPA asked the Committee to conduct a broad brushstroke review of "*Environmental Goals for America: With Milestones for 2005*". Because the Goals document is a policy document, and does not contain an in-depth explanation of the relevant scientific issues, the Board was asked to focus on the use of science to inform goal-setting.

The charge to the Committee was:

- a) Do the proposed measures use the most reliable national-level data currently available or likely to become available? Are there better measures available to gauge progress towards the goals? One place where we would particularly like your help is on the milestones and measures for the Healthy Terrestrial Ecosystems goal.
- b) Are there issues of science related to these goals and milestones that ought to be better explained or of which EPA ought to be made aware?

### 3. GENERAL FINDINGS

Overall the document is well written and instructive. The Committee appreciates the "generality" of the presentation noting that the goals are appropriately based on policy, not on a scientific evaluation of the environmental hazards the country is facing, but this point should be made more explicit.

The Committee compliments the Agency for publicly identifying goals across the diverse sets of environmental legislation, and for developing and producing such a comprehensive and impressive set of goals and milestones. The idea of setting goals and measuring progress is good and the Agency is to be commended for submitting the document for review before it is finalized.

There is a general concern, however, that the goals and milestones may be overly ambitious with respect to the availability of resources and technologies required to reach them, and may call for a level of Federal interagency, state, and stakeholder involvement and cooperation that is well beyond what has previously happened with respect to environmental protection. Nonetheless, it would be hard to claim that any one of the goals in the document is unworthy, even though the goals share, as with many such undertakings, a loftiness that may be impossible to attain in a world that ascribes absolute meaning to words such as "safe."

#### 3.1 Objectives vs. Milestones

Milestones are generally regarded as a *series* of checkpoints by which progress towards a goal can be measured. Having only one date for measurement does not constitute a series. Thus, the milestones might better be called objectives for 2005. The document would be more valuable if it defined a trajectory of intermediate milestones by which progress could be assessed.

Another comment that bears on the ability of the goals to accomplish the scientifically-based objectives of the Goals document is that there are no intermediate-level options presented. Further, there is no sense of what steps the Agency will take (e.g., budget allocations) to maintain progress on each of the milestones. What happens if a milestone is not met? How are priorities to be set across milestones if it becomes apparent that all will not be achieved given the resources available for implementation? For example, what happens if it is clear that the milestone of a net increase of 100,000 acres of wetlands by the year 2005 cannot be met unless considerably more funding is made available for acquisitions of private lands or for restoration activities? How would allocation of additional resources to meet this goal impinge on the ability to achieve other goals?

### **3.2 Clarity of Science**

In some cases comparisons have been made to early time periods, for instance the 1980s, as the baseline. While the Committee recognizes that often these are the only data available, it would be helpful if the Agency stated that fact. Use of old data as a comparison may be perceived as a device which allows the Agency to be well on the way to achieving the goals at the time they are set. In such cases, the extended time periods, as great as decades, could witness major environmental changes.

Where measures of effectiveness and achievement are presented, care needs to be taken to define them clearly. For instance, in Goal 6, Milestone 5, the measure of success is the increased use of biopesticides. However, without parallel measures of health outcomes, especially monitoring of the incidence of infectious diseases and allergies, the goal and milestone do not provide assurance that we will achieve better environmental results or quality of life. When tracking progress and measuring success, care should be taken to include measures of outcome or of processes that have been shown to achieve the desired result.

### **3.3 EPA's Role**

The role of EPA compared to that of other Federal and nonfederal entities needs to be put into context with respect to the overall process needed to achieve these goals, and it should be made more explicit that the goals rely on cooperation with non-Federal entities.

If the Goals document is truly a document for the nation, and not just for the EPA, then the Federal government as a whole needs a strategy for how to proceed. The next iteration of the Goals document should identify the coordination needed with other Federal, and perhaps state and local entities. The document could then specify the Agency's goals versus the nation's goals. It might be important for the EPA to add a goal which indicated the need for the Agency to act to coordinate environmental efforts across agencies. For example, for habitat-related milestones, there are at least two approaches: prevent further degradation of terrestrial ecosystems for the ecosystems left, and restore damaged ones. The goals are a mix of the two, but most of what needs to be done does not come under EPA's mandate, so there is a real question about how realistic they are.

Similarly, the document relies on voluntary actions by Americans. This also leaves uncertainty in how goals and milestones would be achieved. However, the Committee does note and support the Agency's intent to inspire voluntary actions.

### **3.4 Organization**



The draft Goals report is structured around program office- or media-specific issues, but this presents difficulties in recognizing and addressing cross-cutting issues. One possible reorganization would be to develop a meta-structure, with three main sections within the Goals document: a) environmental goals relating to human health; b) environmental goals relating to ecological health; and c) environmental goals relating to quality of life issues. For example, the ecological section would have as its primary focus the preservation, restoration, and sustainability of a diverse set of ecological systems, including various types of terrestrial, wetland, freshwater, estuarine, and marine ecosystems.

With respect to ecological health, the current draft only contains a sustainability goal for "healthy terrestrial ecosystems". However, the sustainability of aquatic and marine ecological systems are just as important. Under the proposed structure, rather than focusing on "clean waters", the focus, ecologically, would be on healthy aquatic and marine ecological systems, and the separate issues of clean drinking water would be addressed under the section relating to human health goals. Such a reorganization might result in some redundancy, but this could be mitigated by showing a matrix of goals cutting across human health, ecological, and quality of life milestones. One major advantage of this structure would be the identification of missing pieces; again the example is the sustainability of ecological systems other than just terrestrial systems.

### **3.5 Approach**

The document reflects EPA's desire to communicate effectively with the American public on an easy-to-relate basis, through a set of challenges and a report card. In general, the milestones are reasonable surrogates for the real environmental improvements that are truly desired by society, and they are defined by quantitative information that can be measured with reasonable accuracy (or at least precision). However, there is also concern that some of the milestones identified in this document lack sufficient specificity to be judged as to their attainability by the year 2005.

The milestones presented contain two types of measures, process (how are you going to do something) and outcome (how does what you did impact the health of humans or ecosystems). Process measures are here meant to include all those measures that represent administrative or policy implementation activities, such as the number of permits issued, the number of sites cleaned up, or the number of states given regulatory authority. These are distinct from outcome measures, which report exposure to and/or effects in the at-risk human or ecological systems. Examples of outcome measures include blood lead levels (human exposure outcome), incidence rates of lung cancer (health effects outcome), pH levels in acid-sensitive lakes (ecological exposure outcome), and the number of hectares of wetlands restored (ecological effects outcome).

These two types of performance measures are intertwined in the document. The Committee acknowledges that both are appropriate and necessary. For example, sometimes the process measures are all that can be monitored until sufficient time has passed for effects to have occurred; in other cases, effects measures are inappropriate because of signal-to-noise issues; and in still other cases, effects measures are a preferred way to demonstrate the actual efficacy of the environmental decision. Thus, while outcome measures may be preferable to determine that the controls are producing the anticipated outcome, monitoring of the control process may be the only practical way of assuring the continued effectiveness of controls.

The key issue to note is the continuing need to measure what one really wants to achieve -- improved health and ecological outcomes. Thus, EPA is often forced to use processes or intermediate or surrogate outcomes as success measures. However, the direct outcome measures of exposure reduction or reduction in health/ecological outcomes, if available, are preferable to the indirect process ones. The Committee recommends that the Goals document include a discussion of these types of performance measures and identify each measure proposed for each milestone as being in one category or the other.

The document would also be strengthened if it more clearly recognized that environmental protection is but one of our goals, and placed greater emphasis on restoration of polluted environments.

### **3.6 Ranking Goals and Setting Priorities**

Although the Goals Document explicitly states that it does not attempt to rank the goals and milestones in order of importance, it leaves open the question of how priorities for advancing toward the goals will be set. Some discussion of the criteria that might be used would be desirable.

The Science Advisory Board's 1990 report *Reducing Risk* (SAB, 1990) provides advice to the EPA and other Federal agencies about the use of science to help set priorities. Thus, the Committee recommends that the Agency use the methodologies and other recommendations from this report as a central component of the process to set priorities across milestones and goals. Additional insights have also been provided by the Congressionally mandated review of the costs and benefits of the Clean Air Act, 1970-1990, and the review offered on it by the Advisory Council on Clean Air Act Compliance (SAB, 1997).

Furthermore, the SAB's Integrated Risk Project (IRP) will be finished this fall. When it becomes available the Agency should find certain recommendations useful for the Goals project. Perhaps the IRP's Risk Reduction Options Subcommittee (RROS) methodology and recommendations could be of use in thinking about setting priorities.

Moreover, when the IRP report becomes available, the Agency should consider adding milestones to the Goals document that reflect the high and medium categories of environmental risks as characterized by the IRP's Ecological Risk Subcommittee (ERS). Some of the higher risk stressors are explicitly listed in the Goals document with milestones, but several are not. In the meantime, the Reducing Risk Report provides guidance on the more important ecological risks that should be addressed by Agency goals.

### **3.7 Research Needs to Meet Goals**

Reaching the stated environment goals and meeting the milestone objectives will require the full employment of known technologies and the efforts of all governmental agencies, industries, academia and the public-at-large. But in many cases it will also require major research investments, both to improve existing technologies, as well as to develop new approaches to old problems.

While the goals are theoretically achievable, as well as highly desirable, the scientific bases and data to reach these goals in full, and to evaluate significant progress towards the goals, are considered insufficient. Each goal, and each milestone within the goals, requires research for a better understanding about the effects of environmental stressors on human health and the environment.

Examples of critical needs include an improved basis for identifying appropriate measures of human health, ecological health, and quality-of-life so that we can better evaluate progress towards meeting environmental goals. Another example is an improved capability to characterize environmental exposures and risks, understand how most effectively to allocate resources across risk-reduction measures, and how to anticipate risks of the future. Also, effective databases are needed to provide the time-trends of the endpoints that relate to the environmental milestones and goals.

Thus, while it is clear that the purpose of the Goals document is not to lay out a research agenda, a scientific understanding goal is necessary to ensure that scientific information and data are sufficient to sustain an approach and validate progress.

## 4. CONCLUSIONS AND RECOMMENDATIONS

The 12 Goals together cover most major issues related to human health and the environment. Overall, the Committee found the document to be well written and instructive. The "generality" of the presentation is appropriate and by publicly identifying goals across the diverse sets of environmental legislation, the Agency should stimulate public discussion of what Americans are seeking to accomplish in environmental protection and what they are willing to pay for such protection.

There is a general concern that the goals and milestones may be overly ambitious with respect to the availability of resources and technologies required to reach them, and because they call for a level of Federal interagency, state, and stakeholder involvement and cooperation that is well beyond what has previously occurred for environmental protection. Nonetheless, it would be hard to claim that any one of the goals in the document is unworthy.

There is also concern that the goals and milestones identified in this document lack sufficient specificity to be judged as to their attainability by the year 2005. In addition, there are no intermediate-level options presented, and there is no sense of what steps the Agency will take (e.g., budget) to maintain progress on each of the milestones. How are priorities to be set across milestones if it becomes apparent that all will not be achieved given the resources available for implementation?

The Committee notes several key overarching themes that EPA developed in the document and suggests that they be more consistently applied:

- a) Link individual goals and their associated strategies to each other to reinforce the multiple benefits of many proposed actions.
- b) Promote pollution prevention as the major path to long-term sustainability.
- c) Develop monetary and non-monetary incentives for individuals and groups in the public and private sectors to pursue waste reduction/pollution prevention activities.
- d) Design and implement communication strategies that bring information on individual goals and on the relationships among goals, as well as the interrelationships among key strategies, to the public and decision makers.

- e) Set up and implement a process for tracking indicators that help determine progress toward the goals and for tracking the emergence of new factors that could affect that progress.
- f) Reassess the progress to the goals individually and as a whole frequently, and modify specific strategies as needed.

The Committee recommends establishing a broad science goal. Sound science, especially when communicated effectively, leads to wiser decision-making. Reaching the stated environment goals and meeting the milestone objectives will require the full employment of known technologies and the efforts of all governmental agencies, industries, academia and the public-at-large. But in many cases it will also require major research investments, both to improve existing technologies, as well as to develop new approaches to old problems. While the goals are theoretically achievable as well as highly desirable, the scientific bases and data to reach these goals in full and to evaluate significant progress towards the goals are considered insufficient. Thus, each goal, and each milestone within the goals, requires research for a better understanding about the effects of environmental stressors on human health and the environment.

The Committee commends the Agency on the goal to empower people with information and education and expanding their right to know. However, in elaborating the specifics of this general goal, more attention needs to be given to the objective of improving public understanding of the scientific bases of environmental decision-making through education and outreach. Thus, the committee believes that the Goals document also needs a specific goal for environmental education to develop an improved set of institutions and mechanisms that will assure that the nation will improve its fundamental scientific understanding that it will need to make future environmental decisions.

The "Reducing Risk" report and other comparative risk studies have indicated the highest risks to ecological systems are from physical stressors such as habitat alteration and hydrologic modifications. The Goals document should be consistent with this increased recognition of the importance of non-chemical stressors in the environment. Many wetlands and other freshwater systems have been affected by or are at greater risk from these stressors than by exposures to chemical pollution.

## References

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## APPENDIX A. FINDINGS ON LONG RANGE GOALS & MILESTONES

In this Appendix, the goals and milestones are listed and then followed by the Subcommittee's comments on each.

### A.1 Goal 1- Clean Air

**Every American city and community will be free of air pollutants at levels that cause significant risk of cancer or respiratory and other health problems. The air will be clearer in many areas, and life in damaged forests and polluted waters will rebound as acid rain, ozone, and hazardous air pollutants are reduced**

The language in the first paragraph of the "Challenge" section of the discussion of this goal needs modification to ensure that the reader will not interpret the impacts noted as being substantially larger than the best estimates indicate they are.

On p. 11, under the subheading "Carbon monoxide" delete "heart damage" and insert "worsens exercise-induced angina".

On p. 11, under subheading "Nitrogen dioxide" delete the statement "Causes lung tissue damage and increases in respiratory illness and also". At current ambient concentrations in the U.S. the statement is misleading (EPA, 1995).

On p. 12, line 3, it is not clear what is meant by the "residual harmful effects" of these pollutants. Does this mean cumulative effects that are not important with any given occurrence, but that may become important in a cumulative manner over time?

p. 12, line 4: The statement that "there is typically no minimum level we can call safe" is confusing. It appears that EPA is trying to distinguish toxic air pollutants from the criteria pollutants on this basis. There are two problems with this approach. First, we are increasingly faced with difficulty in calling any level of exposure to criteria pollutants "safe" as we identify responses closer and closer to background levels. Second, the difficulty in calling levels of many toxic air pollutants "safe" is more an outcome of our approach to the risk assessment of carcinogens than it is an outcome of our knowledge of the pollutant. The definition of "safety" is a policy call. For many of these materials, a linear, no threshold risk model is assumed, making it impossible to declare a "safe" level of exposure. In such a case, the concern over safety is not based on knowledge of the actual effects of the pollutant, but rather with the mathematics of the risk assessment. Overall, it doesn't seem useful to appear to draw a contrast between criteria pollutants and toxic air pollutants using this statement.

On p. 12, line 4 and throughout the document replace "unhealthy" with "unhealthful". The distinction is that "healthy" and "unhealthy" are more appropriately used to describe a living organism (or an institution); "healthful" and "unhealthful" are more appropriately used to describe something that affects health.

In paragraph 3, line 2, regarding "air toxics", the term is in wide use in air pollution jargon, but "toxics" is not properly a noun. Replace this with "toxic air pollutants" here and throughout the document.

p. 12, inset box: The approach of emissions trading needs to be better described. Unless one already knows what this means, and how it works (which certainly excludes most members of the public), one cannot understand the text.

### **A.1.1 Milestone 1**

**By 2005, the number of cities where air quality does not meet national standards will be reduced more than 96 percent from 1995 levels, thereby making the air safer to breathe for an additional 85 million Americans in 164 metropolitan areas.**

In the wording of the milestone replace "will" with "is required to". It is unlikely that this much progress will be made on urban ozone by 2005.

Under "Past Trends", line 3. "Particulates" like "toxics" is not properly a noun. Replace it with "particles". Rewrite the last sentence to read: "The air in the six remaining areas is required to improve significantly by 2005 and to meet the standards by 2010."

p. 14: The issue of changing standards needs to be dealt with more thoroughly. A goal of reducing the number of noncompliant "cities" (presumably statistical areas) 96% from the 1995 level is stated, but it is not clear if that is still the goal after the ozone and PM standards change. These standards for the two National Ambient Air Quality Standards (NAAQS) pollutants, and the others that will follow, will have a big impact on compliance. A clearer statement is needed.

P. 14, "tracking results": The results are to be tracked as the number of areas out of compliance. While that's one reasonable metric, it isn't a very strong one. It would be better to track the number of people living in areas out of compliance, since the different areas have orders of magnitude differences in population. Moreover, it would be interesting to track the annual (or other relevant measure of) pollutant levels as percentages of the standard. Much progress might justifiably be identified in reducing pollution from present levels, even though the reductions were not sufficiently great to allow the standard to be reached. In other words, more progress might be



made in protecting human health by reducing ozone, etc. in Los Angeles, with a huge population, but not reducing it enough to meet the standard, than by meeting the standard in a dozen smaller population areas.

Air Milestone 1 (p. 14) and 2 (p. 15) involve too much precision for a goal to be achieved in 9 years. "More than 96%" and "will fall 68%" should read "More than 95%" and "will fall by close to 70 %".

Because of the many uncertainties in the proposed ozone strategies (NO<sub>x</sub>/HC combined, etc.), about which PM to control, EPA should be recommending effective research as a prerequisite to achieving the goal.

### **A.1.2 Milestone 2**

**By 2005, emissions of unhealthy smog-causing volatile organic compounds will fall 68 percent per mile per car, compared to 1990 levels.**

Change the wording of the milestone itself by replacing "unhealthy" with "unhealthful" and inserting "for new cars" after "compounds".

Rewrite to make the statements apply to new car emissions. Under "Past Trends" on line 1 insert "new" after "average". Under "Tracking Results" on line 3 insert "new" after "average" and on line 4 insert "new" after "typical".

Mobile source emission models under predict VOC emissions from in-use fleets in most areas of the country where appropriate studies have been conducted (e.g., the Los Angeles basin, the Lake Michigan area, Houston) (Croes, 1996; Korc et al., 1995). EPA doesn't have the "police power" necessary to gather a representative sample of "super emitters" for dynamometer testing to model emissions. With this limitation, the best that can be done is to tell the major success story about reductions in new car VOC emissions.

### **A.1.3 Milestone 3**

**By 2005, increases in miles driven by U.S. vehicles will not interfere with attainment or maintenance of air or water quality standards, nor will increases in driving interfere with fulfillment of the U.S. commitment to reduce greenhouse gas emissions.**

The first part of the milestone cannot be measured reliably by any currently available data, but the CO<sub>2</sub> emissions can be calculated from total motor fuel sales. This writeup fails to mention recent backsliding from the previously planned fleet fuel

economy standards or the trend of increased purchases of light trucks (sports utility vehicles) with higher fuel use.

In discussing this milestone, no attention is given to development of alternate fuels or alternate means of transportation. Moreover, here and elsewhere, there is no mention of the contributions of the DOE programs to develop cleaner heavy-duty engines, alternate fuels, etc.

#### **A.1.4 Milestone 4**

**By 2005, all 174 categories of major industrial facilities will meet toxic air emission standards.**

Under "Past Trends" insert "directly through national requirements established under the Clean Air Act" after "controlled" on line 3.

The big successes seem to be missed (including reductions in toxic volatile organic compound emissions that have resulted from ozone control programs and major voluntary reductions made by industry, in part, because of the SARA Title III Annual Toxic Release Inventory). These should be included in the "Tracking Results" portion of this milestone.

Figure M.4. Insert "Must" before "meet" in the title and insert "requirements" after "have" in the legend. Replace "in" with "by" before "2005" in the legend.

#### **A.1.5 Milestone 5**

**By 2005, sulfur dioxide emissions, a primary cause of acid rain, will be reduced by nearly 10 million tons from 1980 levels.**

In the last line of the second paragraph, insert "cost" after "most" and add a note about the originally projected cost per ton of sulfur dioxide reduced (about \$1,500 per ton) and the current market price for SO<sub>2</sub> reduction credits (roughly \$150 per ton) (GAO, 1994). The economic success of the program is remarkable and is worth noting.

Under "Past Trends" line 3, replace "called for a" with "require".

If possible add an estimate of the timing and amount of NO<sub>x</sub> reductions.

#### **A.1.6 Milestone 6**

**By 2005, annual average visibility in the eastern United States will improve 10 to 30 percent from 1995 levels.**

The technical basis for this prediction is not clear. Is it the SO<sub>2</sub> and NO<sub>x</sub> reductions required by Title IV of the 1990 Clean Air Act Amendments. The milestone is reliably measured.

## **A.2 Goal 2 - Clean Waters**

**All of America's rivers, lakes, and coastal waters will support healthy communities of fish, plants, and other aquatic life and uses such as fishing, swimming, and drinking water supply for people. Wetlands will be protected and rehabilitated to provide wildlife habitat, reduce floods, and improve water quality. Ground waters will be cleaner for drinking and other beneficial uses.**

The goal is for all of America's freshwater systems to support healthy communities. This seems unrealistic, as many freshwater systems have been converted to uses that simply are incompatible with this goal. Moreover, in the ecosystem management concept, the decision is made explicitly about what ecological systems have to be "sacrificed" in order to support the needs of society. For example, waterways in urban areas that are heavily utilized for transportation and other societal uses will not recover to support "healthy communities of fish, plants, and other aquatic life and uses, such as fishing, swimming, and drinking water supply for people." That is not to say there should not be a goal to make all possible freshwater ecosystems as healthy as possible, but meeting this level of ecological condition for all systems is not possible, so it should not be listed as the goal.

The goals statement also seems to concentrate on reducing pollution, but many wetlands and other freshwater systems have been affected by or are at greater risk from habitat alteration and hydrologic modifications, rather than by pollution. Also, there was little mention of the need to protect coastal waters extending beyond the near-shore estuaries.

### **A.2.1 Milestone 1**

**By 2005, there will be an annual net increase of at least 100,000 acres of wetlands, thereby supporting valuable aquatic life, improving water quality, and moderating the effects of health- and property-damaging floods and drought.**

This is certainly a worthy goal and ecologically defensible because of the important contribution of wetlands to ecological and societal systems, but it is unclear how this can be accomplished.

The statement on page 26, 4th line from the bottom is incorrect. It should be reworded to read "The USFWS Status and Trends of Wetlands report is updated every 10 years (Dahl 1990; Dahl and Johnson 1991)." The USFWS National Wetlands Inventory is a nationwide mapping effort, distinct from these Status and Trends reports, that was initiated in the late 1970s and has not yet been completed for the entire U.S.

The milestone proposed for wetlands does not recognize that (1) an increase of 100,000 wetland acres/year will do little to compensate for the 117 million acres of wetlands that have been lost over the past 200 years, and is a much smaller rate than that called for by the NRC (see below), and (2) does not address degradation in quality of the remaining wetlands and the functions they provide.

Recommendations pertaining to restoration of surface waters were quoted from the NRC's "Restoration of Aquatic Ecosystems" (box on pg. 28), but the same report's recommendation with regard to wetlands was not quoted. It calls for an increase in wetland restoration that is 2 orders-of-magnitude higher than that proposed by EPA: "The committee recommends that inland and coastal wetlands be restored at a rate that offsets any further loss of wetlands and contributes to an overall gain of 10 million wetland acres by the year 2010..." (Restoration of Aquatic Ecosystems, p. 12).

In order to achieve this targeted net increase, EPA states it will not examine its own regulatory programs related to wetlands permit issuance under section 404 of the Clean Water Act, but rather will depend upon under funded landowner subsidy programs implemented by the United States Department of Agriculture (USDA) (e.g., Wetlands Reserve Program, Conservation Reserve Program). Given that these subsidy programs have already been in place, it seems naive to expect a reversal in the continued trends of wetland loss.

Because many wetlands are irretrievably lost, there needs to be a mechanism to identify those wetlands most likely to be recoverable. Issues of private versus public ownership are central here, meaning there must be a recognition of the investment required for acquisition of property as well as for restoration activities.

The discussion about expanding wetlands should mention other long-term ecological and health concerns.

## **A.2.2 Milestone 2**

**By 2005, 80 percent of the nation's surface waters will support healthy aquatic communities.**

The milestone is good, as is the supporting discussion. However, the Agency probably has more information available establishing a baseline than is presented. A

greater effort is needed to bring this information together. Part of the success in achieving the goal will be continued Federal leadership in working with states to identify waters that do not meet their stated uses and developing state plans to achieve the water quality or sustainability goals.

### **A.2.3 Milestone 3**

**By 2005, 90 to 98 percent of the nation's fish and shellfish harvest areas will provide food safe for people and wildlife to eat.**

This is a good milestone and the discussion is good too, but there is concern that it may be too ambitious. Many of the contaminants responsible for unsafe fish and shellfish are persistent, cycling the globe, and are already banned or heavily regulated, so improvements in the burdens from these chemicals will be more difficult, and more time may be needed for natural sequestering to occur and render these contaminants non-bioavailable.

### **A.2.4 Milestone 4**

**By 2005, 95 percent of the nation's surface waters will be safe for recreation.**

The metric for this milestone is ambiguous, because while there are two types of recreational uses of water defined, only one overall compliance figure is proposed. As written, it would be possible to meet the milestone by making 95% of the surface waters safe for secondary contact, but none safe for primary contact.

### **A.2.5 Milestone 5**

**By 2005, the number of Americans served by community and rural water wells containing high concentrations of nitrate in ground water will be reduced.**

This milestone would be strengthened if EPA described the plan for how it will deal with this issue, which falls under the auspices of both the Clean Water Act and the Safe Drinking Water Act. The two major options available to reduce the number of people exposed are to: reduce the nitrate releases identified, and to disallow the use of water containing high nitrate for human consumptive purposes. Improving a data base will not help reduce the number of Americans served high nitrate waters.

### **A.2.6 Milestone 6**

**By 2005, the annual rate of soil erosion from croplands will be reduced 20 percent from 1992 levels to a total of 948 million tons per year.**

Both the milestone and the supporting discussion are good.

#### **A.2.7 Milestone 7**

**By 2005, total annual pollutant discharges from key point sources that threaten public health and aquatic ecosystems will be reduced by 3 billion pounds.**

This milestone is problematic ecologically. Using pounds to measure the ecological importance of pollutants does not make scientific sense. However, the milestone would make sense if it were in terms of the percentage reduction of key pollutants planned.

Using pounds in terms of reducing “toxics loading” to receiving waters also does not clearly translate to protection of human health. Exposure to bioaccumulative chemicals is largely indirect, through consumption of fish, not water from the affected stream. Chemicals that impact drinking water safety are those which are not deposited in sediments or bioaccumulated in fish. The major focus of the Clean Water Act is the protection of aquatic ecosystems. This results in an appropriate concern with bioaccumulative chemicals, e.g. non-polar organics and metals, that in some respects protects human health, but its importance in protecting the uses of water for drinking purposes is probably overstated.

This milestone is not consistent with statements in the previous clean water milestones or the state-of-knowledge concerning pollutants, because it lists the priorities for pollution reduction by point sources, such as industry, sewer treatment, and combined sewers, while ignoring earlier statements about the importance of non-point source contributions to surface water pollution. These non-point sources now rival or exceed point source loads to surface waters, and this is where the greatest effort will need to be placed to lessen loading of stressors to surface waters.

Greater emphasis should be placed on potable reuse of wastewater which a number of communities in the U.S. are considering as a drinking water source because of population pressures and the resulting shortages of high quality water sources. Indirect reuse is considered preferable, with some separation in time and space between the Advanced Wastewater Treatment (AWT) output and the intake to the drinking water treatment plant. Sometimes this time and space is provided by groundwater injection wells. Exposures to polar compounds introduced into

wastewaters or produced by wastewater treated and then discharged into a reservoir or stream are well characterized. A strategy needs to be developed to track these chemical inputs that are of potential health concern, perhaps as a potential expansion of the Industrial Pretreatment Program.

On the bottom of page 34, it is unlikely that chlorine, per se, is a water pollutant. The more probable chlorine containing contaminant is hypochlorous acid, hypochlorite or chloramine. The discussion in the Goals document needs to be refined.

Strategy -- The discussion of the Strategy for the Clean Waters goal is well done, but why settle for having only 65% of sewage treatment plants that need secondary treatment in place by 2005? This is an area where we ought to do more, and the goal here should be more stringent. However, it is difficult to determine how the Agency will ensure that secondary treatment is in place in the sewage treatment plants that currently do not have such levels of treatment unless EPA has sufficient clout to make it so. Is there legislative authority or other requirements for compliance? If so, please cite in bullets 1, 3, 4, 5.

The reference to "biological integrity" of types of water should refer to the biological integrity of types of surface water ecosystems.

### **A.3 Goal 3 - Healthy Terrestrial Ecosystems**

**America will safeguard its ecosystems to promote the health and diversity of natural and human communities and to sustain America's environmental, social, and economic potential.**

The goal here is to promote the health and diversity of natural and human communities and to sustain America's environmental, social and economic potential. This is an important goal that explicitly recognizes the critical need for sustainability. The main comment is that precisely the same goal should be established for freshwater ecosystems and estuarine/coastal ecosystems, not just terrestrial ecosystems.

The description of the goal is well done, but the discussion of stressors needs revision. Natural stressors are identified, such as fire, pest outbreaks, and floods but in fact, these natural stressors often become anthropogenic when humans change the frequency, distribution, or intensity of natural events. For example, natural ecosystems are adapted to the natural fire regime, but humans often change the frequency or intensity of fires, which thus become due to anthropogenic stress. Even the effects from storms, such as hurricanes, can be significantly affected by humans, such as when habitat alterations result in the loss of large areas of particular ecosystem types, resulting in diminished capacity to recover for the remaining systems of that class.

The discussion mentions an optimal balance between supporting diverse populations and maintaining sustainable uses on a time frame of decades to centuries, but longer time frames and inter-generational societal values are also important to the concept of sustainability. The reference to the National Biological Survey should be updated to its latest name (i.e., Biological Resources Division of the U.S. Geological Survey).

The Clean Air Act should be added to the list of statutes included in the Responsibilities section (p.42) and should be added to the discussion in the first two paragraphs in that section.

The first paragraph under the "Challenge" section for this Goal needs to include other human values, such as aesthetic and religious benefits that people gain from the ecosystems, as well as recreational benefits.

Second paragraph - (1) Outbreaks of pest species needs to be mentioned instead of just "pest species." (2) The statement assumes "ecosystem recovery" occurs in all cases. However, some systems are disturbance adapted. That is, the loss of the disturbance (its characteristic frequency and/or intensity) would compromise or cause the loss of that ecosystem (e.g., riparian systems are adapted to floods). (3) Human disturbances won't necessarily cause an inability of a system to recover. There might be a shift in dominance of particular successional types (e.g., more early successional than late successional communities).

P. 42, under section on Responsibilities, first paragraph - This section needs to mention lands owned by the Department of Defense, since about 80% of the rare species in the United States occur on these lands (Goodman, 1996; Boice, 1997). Also, it seems that Bureau of Land Management, Tribal, and other agency lands should be mentioned in this section. If some Federal ownerships posing problems are identified, then most or all of them that cause problems should be. These statutes could be listed in a table like is done on P. 142.

Last paragraph - Protecting "ecosystems and wildlife" is redundant; just say "ecosystems" or "ecosystems and their wildlife components." Also, what are the economic incentives directed toward? Please note that tradeoffs are mentioned under the first milestone and should be discussed earlier in the chapter and in the entire report as well.

Third paragraph - "Integrity" is an odd word to use here. Also, replace "support" with "provide long-term support of" in the third line.

### **A.3.1 Milestone 1**



**By 2005, the loss of ecosystem types considered critically endangered, endangered, or threatened will be eliminated.**

This is a worthy milestone, but focusing only on those ecosystems that are on the critical list may mean ignoring better opportunities for sustainability that less critically endangered ecosystems may offer. The key should be to focus on ecosystem management ("community-based protection"). The driver should be whatever ecosystems in the region being managed require improvement in their condition to achieve sustainability, rather than only those in critical condition; otherwise, excessive resources may be invested with lower probability of success and less overall improvement of ecological condition. So this milestone should become a more landscape-oriented goal, focusing on sustaining the spatial distribution of ecosystems of specified levels of ecological condition.

Figure 1 - The regional boundaries are not clear.

p. 45, Lines 2-3 - These statements imply that there is a difference between old growth forests and virgin eastern deciduous forests. Since virgin eastern deciduous forests are old growth forests, reference to them can be deleted in this sentence. Also, in the discussion of tracking, the Department of Defense needs to be included.

### **A.3.2 Milestone 2**

**By 2005, the populations of endangered, threatened, rare, and declining species of native terrestrial animals and plants will be stabilized or increased.**

This is indeed a critical first step in sustaining ecological systems, but if the focus is merely on endangered species rather than on the habitats and ecosystem attributes needed to protect those species, the approach is headed for failure. Thus, this milestone needs to be more consistent with milestone 1.

P. 46, first paragraph - Please add a discussion on plants. Currently, the paragraph only mentions wildlife; yet, plants are 54% of the federally listed and endangered species by taxonomic groups (Figure 2). The dictionary definition of "wildlife" includes plants, but throughout this document EPA does not include plants in the definition.

Third paragraph - Eliminate the first sentence altogether, because there are cases where the statement is clearly not true. For example, the red cockaded woodpecker has 25+ species depending upon it, and the elimination of this threatened species would have dramatic effects upon the biodiversity of the long leaf pine forests (Dennis, 1971).

Figure 3 - The title says by region, but the data are by state.

### A.3.3 Milestone 3

**By 2005, ecosystem conditions and functions will be restored to ultimately provide adequate amounts of habitat with the necessary size, mixture, and quality to sustain native animals and plants in all regions.**

This is a worthy milestone, but doing it for all systems seems unrealistic. Also, this milestone confuses landscape issues (e.g., the distribution of ecosystems) with the condition of ecosystems. It is better to focus on the structure and function of ecosystems with more of a within-ecosystem perspective. For example, other ecological values are important beyond what is mentioned in the first paragraph (e.g., aesthetics, recreation, religious values). The first paragraph is too narrow and here, as well as elsewhere, only wildlife are discussed. Also, while a few agencies are mentioned, the Department of Defense is not, yet about 80% of the rare species occur on DOD lands (Goodman, 1996; Boice, 1997). This is a big omission.

Strategy -- The references should add the Interagency Ecosystem Management Team report. There is a sideline box on costs, but a comparable sidebar on benefits is also needed. Finally, while there is a statement that money is more effectively spent if habitats are protected before the species are driven to extinction, the discussion just focuses on user fees; there are many other valuation factors than just user fees that should be discussed here.

P. 49 - The first statement is not necessarily true. What does representative mean? What are the sizes and distributions of these ecosystems? Are metapopulation dynamics being considered? The second sentence might also be contested. There are likely to be tradeoffs in improving the quality, function, and values of ecosystems. The values of ecosystems need to be defined. Most people think of values as being human-related, rather than system-related. There are cases where these attributes might change, but some people would say that the human community had suffered.

Second paragraph - The first sentence is confusing. Is it referring to landscape properties? M3 focuses on ecosystems. Also, it is not clear why vegetation restoration and land management are both mentioned, because restoration is a particular type of land management.

Past Trends - First paragraph - Fragmentation is mentioned as a category here. Can EPA provide references for the percent declines in the tropical migrants?

Tracking Results - Line 3 - "Ecosystems functions, area, and quality" are strange combinations; what is the definition of quality? What about Department of Defense activities?

P. 51 - Include in references the 1995 report by the Interagency Ecosystems Management Task Force (Christiansen et al., 1996).

Improve scientific understanding, monitoring data, and analytical tools - This paragraph only makes recommendations for improving monetary and data management systems. Yet, there also exists a need for improved analysis tools that focus on ecosystems and landscape properties and that integrate across socioeconomic and ecological sectors. These tools could allow tradeoffs between decision making options and let one see the implications of the various options.

P. 51 - Improved Land Use Decisions - Second sentence - Add evaluation of the long-term environmental impacts of land use decisions to this discussion. Also include not just economic forces, but also socioeconomic and political forces that drive land use decisions.

Regarding "Public-Private Funding for Habitat and Wildlife Conservation", does the reference to "a large outdoor industry" refer to one single company or the host of industries? This section seems to just target "wildlife" yet, it is important to think about habitat for wildlife and other considerations. A broader focus is needed here - what about other recreational, aesthetic, and religious values?

Overall, confusion surrounds the mix between Figure M1 and Figure M3. M1 seems to refer to the loss of ecosystem types only. This approach means that if a few museum specimen examples of a type are maintained, then the metric for retaining the ecosystems types would still be valid. It seems that M3 is trying to pick up some of these valuable characteristics of ecosystems; yet, it fails because it only uses the word "ecosystem". The concept of landscapes needs to come into play. M3 also refers to the term "ecosystem conditions and functions". The traditional words used by ecologists are "ecosystem structure and functions."

What is referred to in terms of "conditions" here. Figure M1 should refer to a discussion of the preservation of the appropriate landscape distribution of ecosystem types, and some of the words under M3 that refer to the area and distribution should be moved to this section. Then, M3 could just refer to the structure and functions of ecosystems and be more within an ecosystem perspective. It is the area of ecosystem types and the spatial distributions across the landscape as well as their "integrity" that must be considered in M1. This would be a more natural fallout into the traditional hierarchy that is used: M1 would refer to landscapes, M2 would refer to populations,

and M3 would refer to ecosystems. Therefore, a reordering of these goals by either going from the smallest to the largest or vice versa, might be more appropriate. It would make more sense, however, to start with the landscape that is given - M1, M2, then M3, in order of presentation.

#### **A.4 Goal 4 - Safe Drinking Water**

**Every American public water system will provide water that is consistently safe to drink.**

Three of the four milestones deal with source water protection which comes under the purview of the Clean Water Act as well as the Safe Drinking Water Act (SDWA). It would be useful if reference were made to the provisions of both as well as to how EPA plans to coordinate its efforts across these provisions.

In addition, intensive efforts are underway at EPA, and other Federal agencies, to understand and control the risks posed by microbes and disinfection by products in drinking water. The Goals document would be strengthened if greater emphasis were placed on the outcomes of these efforts. This could be accomplished through a separate milestone or in the discussion for this Goal.

##### **A.4.1 Milestone 1**

**By 2005, the population served by community water systems in violation of health-based requirements will be reduced from 19 to 5 percent.**

This milestone is laudable, but it should be noted that the increase in "violations" for 1992, noted on figure M.1, were created by the filtration rules that went into effect just then. Because the 1996 Safe Drinking Water Act amendments provide for the use of loans through the State Revolving Fund (SRF) to help communities comply with new regulations, a more objective and useful measure might be to determine how and to what extent the SRF accelerated the process of compliance with the new regulations.

##### **A.4.2 Milestone 2**

**By 2005, every person served by a public water system that draws from an inadequately protected river, lake, or reservoir will receive drinking water that is adequately filtered.**

This milestone provides a different metric than does milestone 1, but it strives for essentially the same endpoint, protection of public health through adequate treatment of drinking water. Thus, milestones 1 and 2 could be combined.

### **A.4.3 Milestone 3**

**By 2005, 90 percent of the nation's river and stream miles and lake and reservoir acres designated as drinking water supplies will provide water that is safe to use after conventional treatment.**

Caution should be taken to avoid the implying that conventional treatment will provide water that is "safe". For instance, chlorine disinfection does not render cryptosporidium noninfectious. This milestone would read better if the phrase "in a relative risk context" were inserted after "safe".

It should also be noted that three Public Health principles guide efforts to insure drinking water safety: protect the watershed; treat the water; maintain the distribution system. This milestone focuses on the first principle, to protect the watershed. While EPA plays an important role in water safety, the Agency doesn't have the authority nor resources to do much about watershed protection. Thus, greater emphasis should be placed on working with other Federal, state and local agencies to reach this milestone.

### **A.4.4 Milestone 4**

**By 2005, 60 percent of the population served by community water systems will receive their water from systems with source water protection programs in place.**

This milestone also focuses on the watershed protection principle. It is a laudable milestone, especially the call for applying the four elements of a groundwater protection program to the protection of surface water supplies. Emphasis should be placed on developing criteria to guide the development of effective source water protection plans and to evaluate the extent to which they are implemented and succeed.

### **A.5 Goal 5 - Safe Food**

**Long-Range Goal: The foods Americans consume will continue to be safe for all people to eat**

Because all the milestones for safe food require manufacturers to commit additional resources, a strong argument could be made that none will succeed without a timely and efficient regulatory response from both EPA and FDA. Mention should be made of the plans for such coordination.

In this section more attention needs to be paid to exposure. Without it, there is no dose, and without dose there is no potential effect. One of EPA's goals should be effective exposure reduction.

#### **A.5.1 Milestone 1**

**Through 2005, the frequency of illegal pesticide residues in food will remain at or below the current low level.**

The thrust of this milestone is to continue to monitor "illegal" pesticide residues in food in an effort to have them remain at or below current levels. This is a straight-forward goal that is adequately addressed in the document. However, the EPA should seek significant input from the FDA and the USDA. This is noted in the text, but a stronger statement concerning the need for close coordination might be appropriate.

EPA has several key activities that will be essential to achieving this milestone and which should be included in it :

- a) Implementation of the Food Quality Protection Act (FQPA) without loss of tolerances on minor crops because farmers are already very short on suitable compounds for many pests and because most fruits/vegetables are considered minor crops
- b) Timely registration of new compounds to provide tools to combat resistance
- c) Approval of import tolerances for crops that are imported from countries with different pest pressures than the U.S.
- d) Timely evaluations/approvals of emergency use requests (Section 18)

The graph does not suggest great promise that the goal will be met, and with the advent of North American Free Trade Agreement (NAFTA) and the General Agreement on Tariffs and Trade (GATT), we need to express a determination for vigilance in checking all foreign produced foods. Further, why is the concern focused only on pesticides? Shouldn't we be just as concerned with the presence of heavy metals in foreign-grown and processed foods?

#### **A.5.2 Milestone 2**

**By 2005, there will be a significant reduction in the use of the food production pesticides that have the highest potential to cause cancer.**

This milestone provides an ideal opportunity to interact with the private sector, and once definitions are clarified, the ability to track results should be straightforward and reasonable. However, it will be hard to defend in a public forum because it is hard to distinguish between a probable human carcinogen, a possible human carcinogen and a substance in the inadequate data/uncertain category. People will see that over 50% of the pesticides in use have the "potential to cause cancer," and this will be unacceptable. A "significant reduction" by 2005 is little comfort. Are pesticides really that bad? Are we talking about significant animal findings that have relevance under food-use conditions? This section needs extensive revision with updated cancer rating guidelines and with a meaningful definition of "cancer-causing potential."

From a public health perspective, the issue of safe pesticide use is not solely limited to their application on food. In fact, such uses may contribute only in small part to the exposures. The concern is pesticides that accumulate (metals also) during food preparation (unclean tables), because of food consumption practices, lack of vigilance in home cleaning and maintenance, and because of cultural differences. It is exposure to, not just the presence of, pesticides in foods that is of concern. Graph M.3 is too idealistic.

Figures M.2a and M.2b would be easier to understand if the pie chart segments were also identified as B,C,D and E, respectively. It would also help to have a box insert that briefly gave the criteria for labeling a chemical as a "B" or a "C".

The text should say that a target for 2005 has yet to be established.

This milestone is really a subset of Milestone 3. If risks are below the EPA definition of "de minimis" (i.e.,  $<1 \times 10^{-6}$  increased lifetime risk), then there is minimal potential for causing cancer under the prescribed use patterns and no public health reason to reduce use. This milestone should be combined with Milestone 3 and restated as achieving the statutory standard of "reasonable certainty of no harm".

### **A.5.3 Milestone 3**

**By 2005, all pesticide residues in food will meet the statutory standard of "reasonable certainty of no harm."**

The Milestone is fine. Tracking results should be accomplished using FDA/California/USDA monitoring data where those data are available rather than relying on worst-case field trial data.

This milestone, while simple in title (reasonable certainty of no harm), will require a myriad of special considerations to implement. These are necessitated by the requirements of the FQPA. Implementing this "new" legislation will require innovative

thoughts and procedures. It may not be as simple as the "goals" might suggest; it will assuredly be an evolutionary process. The complexity of this issue needs to be made more apparent in the document. The plan to reduce estimated exposures that are greater than 75% of the RfD sounds like a new standard. Is that appropriate or legal? It might be better to use the 75% value as a flag for closer monitoring to be sure that the RfD does not become exceeded in time. The EPA may wish to have the scientific rationale reviewed before including it in this Goals document.

That the percentage of U.S. crop acreage under integrated pest management (IPM) will go up to 90% is a laudable goal, but it is completely outside of EPA's control. IPM decisions are made by farmers. A more appropriate goal would be that EPA will complete timely reviews of submissions for registration and for compounds that are used in IPM so that farmers will not be prevented from using IPM by a lack of suitable pesticides. This is a major problem at the present time. EPA could give priority to submissions for these applications and could also develop other incentives for registrants to have pesticides that fill a gap in the IPM arsenal. Another possible activity would be to identify pest/crop combinations that need additional pesticides to make IPM approaches more successful.

With respect to increasing the use of safer pesticides, if all compounds reach the goals established in Milestone 3, "reasonable certainty of no harm", then there is no reason to have an additional goal of 75% of safer (reduced risk) pesticides. If this goal is retained, care must be taken to define reduced risk in a meaningful manner (e.g., taking into consideration exposure as well as toxic potential, not just application rates). Furthermore, if IPM is a critical criterion, then efficacy also ought be considered.

The term "safe" needs to be defined in the context of the statement that by the year 2005, all "inert" ingredients in registered pesticides will be safe. The process that EPA will follow to achieve this worthy goal also needs to be defined.

The objective to have better application technology practices has great potential to reduce exposures to pesticides and to improve efficiency. It should be given greater emphasis in this document, and registrants should be given greater incentives for conducting research on this need and perhaps consideration should be given to expedited reviews of data.

Communication - The concept of "reasonable certainty of no harm" can be communicated to the public in an acceptable way. It is a critical concept for the public who must understand the difference between "reasonable certainty" and "absolute safety." The public will be accepting of the presence of pesticide residues in their food under these conditions.



This milestone should be ideal for opportunities to interact with the private sector about planning and budgeting. Accountability could be improved if the reporting of RfD exceedances would include the magnitude of exceedance. Emphasis could be placed on reducing the most severe exceedances, and not just the number of exceedances. The document could be strengthened by more discussion of the "unknowns" that will require investigation/consideration with the development of "biologically engineered" pesticides.

## **A.6 Goal 6 - Safe Homes, Schools and Workplaces**

### **All Americans will live, learn, and work in safe and healthy environments.**

Many of the environmental factors affecting the safety and health of all Americans are beyond direct influence by EPA, including firearms, drugs, domestic violence, infectious disease, most allergens, and non-pesticide impacts of diet. EPA's mission is to ensure that non-occupational exposures to physical and chemical agents in the environment will not result in unsafe or unhealthy conditions.

#### **A.6.1 Milestone 1**

### **By 2005, the number of young children with high levels of lead in their blood will be reduced by more than 50 percent compared to the late 1980s.**

This milestone is reasonable considering past trends and on-going programs directed at reducing or eliminating lead-containing paint from residences, which is generally accepted as the major primary source of exposure to lead, particularly for children living in poor urban areas. Importantly, EPA has recognized that African-American children are a population subgroup at increased risk from exposure as a result of a combination of economic, social, and demographic factors and, therefore, should be specifically targeted. The confluence of these same societal factors, however, exists for other groups, including Hispanic children, Indians, rural poor Caucasians .

While the National Health and Nutritional Evaluation Survey II (NHANES II) only considered Whites and African-Americans as ethnic-origin categories for the purpose of selecting a representative sample of the national population, NHANES III included also Hispanics. Therefore, it is important that these data be considered as soon as they are available to determine if Hispanics (and/or other ethnic groups) should also be more specifically targeted.

Besides NHANES data (which obviously has the advantage of being based on a representative sample of the U.S. population), other sources of information on blood lead levels in children are available, mainly through state and city health departments

which monitor individuals, particularly children, frequently with federal funding through programs such as those mentioned on page 88 of the draft document. While these data are not representative of nation-wide blood lead concentrations, they are the result of efforts targeted at the sectors of the population most likely to be at increased risk from exposure and, therefore, would be very useful in conjunction with the NHANES information to both measure progress towards attaining the milestone and also determine if it indeed has been realized by the targeted date.

It is important to recognize that a statistically-based, representative sample of the population may not necessarily capture individuals belonging to very small groups who are at high risk from exposure because of the specific and unique characteristics of the group (the term “special populations” is sometimes used for these groups). As leaded-paint abatement programs increasingly succeed at reducing paint as a source for exposure to lead, other sources may become more important and should be considered. The difficulty with local or state blood-Pb data (as with other environmental data), is its limited availability due to non-standardized methods of record-keeping and reporting. An effort should be made, perhaps through agencies such as the Department of Housing and Urban Development (HUD) and the Public Health Service Centers for Disease Control (CDC), towards standardization, so this information can be put to use.

The children’s age targeted by EPA in the Goals document (i.e., 1 to 5 years) and in the Healthy People 2000 report (i.e. 6 months to 5 years) differ. This difference should be addressed in the milestone, because it could impact achievement of the stated goal. By six months, many children start or are already crawling and can be exposed through mouthing of objects in their environment that they can easily reach. At a minimum, the document should indicate EPA’s basis for the difference on target ages.

#### **A.6.2 Milestone 2**

**By 2005, 27 million homes will have been voluntarily tested for radon, corrective action will have been taken in 1 million homes, and 1.5 million new homes will have been built with radon-resistant features, resulting in a 25 percent reduction from 1985 levels in the number of Americans exposed to elevated radon in their homes.**

The data sources presented for this milestone contain uncertainty, but they are the best available.

Figure M.2: Zero values cannot be shown on a log scale. As drawn, the 1985 values can be construed as 100,000. A break in the vertical axis with a true zero below the break point would be more accurate.

The statement that radon is “the second leading cause of lung cancer” may be misleading. Many scientists debate the magnitude of the health consequences of environmental levels of radon, and some argue that they are not dangerous at all.

While the estimate of 500 lung cancer deaths avoided per year is properly qualified, it is not placed in context. The baseline (14,000 per year) should also be mentioned. That would allow the reader to understand better whether the goal is ambitious or not.

### **A.6.3 Milestone 3**

**By 2005, children's exposure to environmental tobacco smoke will decrease through voluntary actions in the home. The proportion of households in which children 6 and younger are regularly exposed to smoking will be reduced to 15 percent from over 39 percent in 1986.**

This milestone is fine. It can lead to the possibility of reducing acute morbidity or mortality through empowerment of the general public, but two questions arise. First, what is EPA's mandated responsibility for indoor air? Second, if there is none, what is EPA going to do to promote public awareness?

EPA should tie this closely to its efforts to effectively reduce exposure to particulate matter.

Under "Past Trends" first paragraph, Environmental Tobacco Smoke (ETS), mention the new Food and Drug Administration rules which will move toward the HHS targets.

### **A.6.4 Milestone 4**

**By 2005, the number of workers suffering adverse health effects caused by acute poisoning from pesticides will be reduced significantly from 1992 levels.**

This milestone is communicated well. However, the reliance on measures of success based on data available from the American Association of Poison Control Centers for case reports on agricultural workers may be insufficient. Given their responsibility for workers, EPA should refer to the National Institute of Occupational Safety and Health (NIOSH) and the Department of Agriculture for help with this milestone. Reference should also be made to the National Institute of Environmental Health Sciences (NIEHS) which supports academic Center programs (at the University of Iowa, the University of California at Davis, and Oregon State University) that focus

on such concerns. EPA needs to harness these resources to make progress on this milestone. Data from these organizations are likely to be more specific than are data from poison control centers. One concern with poison control centers is that the number of cases reported by them includes accidental exposure at home. Since milestone 4 refers directly to workers, EPA should make it clear that the data collected will be screened to include only work-related cases.

#### **A.6.5 Milestone 5**

**By 2005, the use of safe agricultural biopesticides will double from 1995 levels.**

To the extent that the biopesticides are perceived by the public as more "natural", there should be excellent acceptance of this milestone and it should be ideal for opportunities to interact with the private sector. The ability to track results should be straightforward and reasonable.

However, it is not clear from the evidence presented, or even in concept, that overall risks to agricultural workers are reduced by replacing some of the chemical pesticides with biological pesticides. This goal needs a much better justification than that provided on page 85.

#### **A.6.6 Milestone 6**

**By 2005, the number of existing industrial high-production-volume chemicals shown to be used safely in the workplace will nearly triple.**

This is a noble goal, but it will be difficult to attain.

Some in the public may read the milestone as 'of the 3000 to 4000 existing industrial high-production-volume chemicals, EPA will try to have 1/2 to 2/3 of them evaluated for safe use by 2005.' Phrased this way, it is not a good goal. The phrase "shown to be used safely" will imply to the public that the others are likely not being used safely. To the extent that the real milestone is the preparation of an extensive document on what is known about the toxicity of these chemicals, then the goal is probably realistic, and certainly the private sector should be able to contribute markedly to this. However, how can tallying the evaluations of existing chemicals, as described here, show that there is safe use? Such an analysis requires extensive input from OSHA and NIOSH about actual exposures and problems. This milestone needs to better explain what EPA actually plans to do in its evaluation of industrial high-production-volume chemicals.

#### **A.6.7 Milestone 7**

**By 2005, worker protection will be promoted for as many as 10,000 new chemicals.**

The claim that EPA will review 10,000 new chemicals and "establish exposure limits for all new chemicals that might present an unreasonable risk to workers" isn't credible. Setting occupational exposure limits is a demanding and time-consuming task that taxes the talents of highly-skilled and broadly-experienced scientists. EPA staff resources and/or contract budgets are unlikely to be adequate to meet this goal in any responsible and useful manner. EPA ought to be cautious about setting a goal whose implementation would largely be the responsibility of the Occupational Safety and Health Administration (OSHA).

The National Research Council Report on Toxicity Testing (NRC, 1984) described the data base on the 70,000 chemicals in commerce. Milestone 7 refers to 10,000 new chemicals being added to a base of 70,000 chemicals between now and 2005. Weren't there new chemicals added between 1984 and now? Are there plans for reviewing them?

#### **A.7 Goal 7 - Toxic-Free Communities**

**By relying on pollution prevention, reuse, and recycling in the way we produce and consume materials, all Americans will live in communities free of toxic impacts.**

Pollution prevention, reuse and recycling certainly offer the most opportunity and promise for achieving a toxic-free environment. While much progress has been made, there are more possibilities for achieving even higher reductions in discarding, and avoiding generation of wastes containing toxic chemicals. This goal provides the incentives and enticement for everyone to participate in realizing a "toxic-free" environment for all Americans. However, the Committee notes that there is no such thing as a "toxic-free" environment. The Committee also notes that reuse and recycling do not necessarily reduce exposures to toxic substances.

##### **A.7.1 Milestone 1**

**By 2005, industrial facilities will reduce by 25 percent (from 1992 levels) the quantities of the toxic chemicals in waste streams that are released, disposed of, treated, or combusted for energy recovery. Half of this reduction will be achieved through pollution prevention practices.**

This milestone is set with 1992 as the baseline. Available information on page 97 of the Goals report shows that while there was approximately 6% decrease in toxic chemical releases between 1992 and 1993, as indicated by TRI data, there has been

very little or no further reduction shown in the TRI data between 1994 and 1995. In 1994, new toxic chemicals were added to the TRI list. In 1997, new industries became subjected to the TRI reporting system, making it most likely that the reportable quantities of toxics will increase in the years 1998 and beyond even though there may have been reductions in the release of that subset of chemicals previously reported. Pollution prevention can and will help reduce the reportable quantities. However, manufacturing processes may also have to be modified to achieve the desired reductions. It is quite likely that in some situations (e.g. coal burning power plants), opportunities for reducing ash production can only be achieved if there are low-ash coals available to burn in the utility boilers. Therefore, the 25% reduction may be an overly lofty milestone to achieve by 2005.

### **A.7.2 Milestone 2**

**By 2005, more than 99 percent of new chemicals approved since 1995 will have been used safely and will not require additional controls.**

Both the milestone and the supporting discussions are clear.

### **A.7.3 Milestone 3**

**By 2005, the number of existing high-production-volume chemicals shown to be used safely will nearly triple.**

This milestone seems to repeat Milestone 6.6. Further, its relevance to community exposures seems obscure under this goal, because high-production-volume chemicals should not, as such, be directly accessible to the general public.

### **A.7.4 Milestone 4**

**By 2005, municipal solid waste will be recovered for recycling or composting at a rate of 35 percent. Municipal solid waste generation will be reduced to the 1990 level of 4.3 pounds per person per day, with the amount of waste combusted or landfilled decreasing to 2.8 pounds per person per day.**

Reducing per capita generation of municipal solid waste to 4.3 pounds per person per day from 4.4 pounds per person per day in 1994 is not a very challenging milestone. However, increasing recycling or composting to decrease to 2.8 pounds per day the amount needing disposal or combustion is an ambitious undertaking. Municipal solid waste production remains a major source of waste in our society. For

clarity, the first sentence of the milestone should be changed to "By 2005, 35% of municipal solid waste will be recovered for recycling or composting."

#### **A.7.5 Milestone 5**

**By 2005, the presence of the most persistent, bioaccumulative, and toxic constituents in hazardous waste will be reduced by 50 percent from 1991 levels.**

This milestone is critical to achieving the toxics-free environmental goal. EPA is in the process of defining the details for tracking results, providing an opportunity for an advisory group like the Science Advisory Board to provide scientific advice in finalizing the list of the most persistent, bioaccumulative and toxic constituents in hazardous wastes that would be tracked. However, it should be noted that reducing the amount of each constituent by 50% will not necessarily render the waste nonhazardous.

#### **A.8 Goal 8 - Preventing Accidental Releases**

**Accidental releases of substances that endanger our communities and the natural environment will be reduced to as near zero as possible. Those which do occur will cause only negligible harm to people, animals, and plants.**

The context of the wording in the goal may inadvertently exclude aquatic organisms such as fish and may also exclude birds. It should be reworded to specifically include humans, terrestrial and aquatic organisms.

The Strategy section under this goal speaks of "radiological substances" rather than "radioactive" ones. The latter term is probably better to use consistently.

##### **A.8.1 Milestone 1**

**By 2005, there will be 25 percent fewer accidental releases of oil, chemicals, and radioactive substances than in 1993.**

The Committee supports the intent of this milestone, but recommends that EPA heed the commentary on page D-11 of the draft Goals document, recommending that the milestone be restated in terms of total quantity of release or at least in releases over some threshold of size. EPA could go a step further and suggest that the volumes of releases be weighted by toxicity before calculating the reduction. Otherwise, credit can be taken for reductions in small releases of low-toxicity materials with little real benefit to the environment.

Furthermore, although the milestone includes radioactive substances, there is no suggestion of any intent to measure the number or activity of such releases or any clue about how or where such data would be obtained. With respect to radioactive substances, unless this milestone can be better explained or at least related to another federal target (e.g., of the Nuclear Regulatory Commission), the reference to radioactive substances should be removed. If it is retained, the text should explain whether the 25% reduction applies individually to oil, hazardous substances, and radioactive substances, or to all releases combined (whether or not volume and toxicity are considered).

#### **A.8.2 Milestone 2**

**By 2005, there will be a 50 percent increase over 1993 levels in the number of industrial facilities in high-risk areas that have either eliminated hazardous substance inventories or reduced them to minimum levels.**

Clarification would help better define the milestone and how it will be tracked. Clarification is also needed as to whether this Milestone is intended to include facilities with inventories of radioactive substances (e.g., nuclear power plants and nuclear medicine facilities)?

#### **A.9 Goal 9 - Safe Waste Management**

**Wastes produced by every person, business, and unit of government in America will be stored, treated, and disposed of in ways that prevent harm to people and other living things.**

This goal complements the toxics-free communities goal as well as the restoration of contaminated sites goal. By emphasizing the value of proper storage, treatment and disposal of wastes, we will have reduced the need for remediation of contaminated sites in the future. By recycling, reusing and reducing generation of wastes, we will have reduced potential for releases to the environment.

##### **A.9.1 Milestone 1**

**By 2005, chlorinated dioxin/furan emissions from waste-burning facilities will be reduced 98 percent from 1994 levels.**

This milestone and supporting discussions are good, reflecting the high priority placed on reducing chlorinated dioxin/furan emissions. However, a 98% reduction may be overly ambitious. The Agency should verify its estimates since the December 1996 draft document indicated that the figures were approximate and would be finalized later.



### **A.9.2 Milestone 2**

**By 2005, emissions of mercury and other harmful pollutants from waste-burning facilities will be reduced by at least 80 percent from 1994 levels.**

The milestone refers to 1994 and an 80% reduction, yet the accompanying description refers to 1993 and a 90% reduction. These should be made the same for consistency. Further, it should be noted that waste-burning facilities may be a small contributor to environmental mercury exposures.

### **A.9.3 Milestone 3**

**By 2005, the annual number of confirmed releases from underground storage tanks will be 80 percent lower than in 1994.**

This milestone is well-defined and is consistent with the mature underground storage tanks regulatory programs at the federal and state levels.

### **A.9.4 Milestone 4**

**By 2005, wellhead protection areas and vulnerable ground waters will no longer receive industrial wastewater discharges from septic systems.**

Both the milestone and the supporting discussions are clear.

### **A.9.5 Milestone 5**

**By 2005, 10 percent of the amount of spent nuclear fuel, high-level waste, and transuranic radioactive waste currently stored across the nation will be disposed of in accordance with EPA disposal standards.**

This milestone is extremely modest, and will be achieved if 25% of transuranic (TRU) waste gets into the Waste Isolation Pilot Project (WIPP), an accomplishment that EPA already projects will occur. It also fails to explain whether disposing of 25% by volume of the TRU waste would eliminate 10% of the risk from all covered wastes.

The DOE report referenced for this milestone provides appropriate data, but there is probably a more recent edition than the 1992 reference cited.

It may be outside the charge, but the "box" on page 116 on "Low- and High-Level Radioactive Waste" needs to be reviewed, particularly the statement that low-level wastes are not by-product materials.

This milestone apparently does not apply to low-level mixed waste or to Naturally Occurring Radioactive Materials (NORM), such as petroleum production pipe scale or coal ash. NORM waste could well be more of a real environmental problem than the covered wastes or the wastes at contaminated sites discussed in Goal 10. Continuing intergovernmental problems in the regulation of the disposal of mixed wastes are also important to solve. The brief mention of EPA's continuing interest in NORM and low level wastes at the end of the Strategy section is not sufficient .

#### **A.10 Goal 10 - Restoration of Contaminated Sites**

**Places in America currently contaminated by hazardous or radioactive materials will not endanger public health and the natural environment and will be restored to uses desired by surrounding communities.**

This section is very idealistic. Part of the reason for success is that some of the sites have finally been cleaned after regulatory and legal delays. The Agency should be pleased with this forward movement. However, many sites require complex remediation planning, exposure evaluations and land use options. In some cases, national security or other interests prevent sites from being restored to uses desired by surrounding communities (e.g., DOE plutonium waste disposal sites may be maintained because there is no way to treat the wastes and no other place to place them). Flexibility is needed to obtain creative solutions on clean-up objectives and land use. This will address prioritization for contaminant removal or "in situ" capsulation or treatment and to solve the additional problems caused by the persistence of some radioactive wastes.

The first paragraph of "the challenge" states that radioactive wastes are "highly toxic" and can persist in the environment for "thousands of years." The use of the term "highly toxic" is meaningless without a statement regarding compared to what and conditioned on its complement of radionuclides and their concentrations. A safer statement would be something like "can increase cancer risks for exposed persons." The persistence of radionuclides is highly variable, but they can persist for billions of years. The metals in hazardous wastes are infinitely persistent. The intent of this whole sentence should be revisited and the sentence revised.

Although the studies cited in "The Challenge" on page 126 do not concern radioactive substances, the strength and causality of the associations reported seem questionable. They paint a picture of a severe national problem that does not conform with previous SAB ratings of Superfund sites among environmental issues. While the SAB could be wrong, the Agency needs to be sure about the message it is trying to convey with these bullets and the following text.

### **A.10.1 Milestone 1**

**By 2005, long-term health threats will be eliminated and cleanup will be completed at 95 percent of the 1,212 non-federal facility contaminated sites on the 1995 Superfund National Priorities List.**

This is a good milestone, and it provides an ideal opportunity to interact with the private sector. The ability to track results should be straightforward and reasonable.

### **A.10.2 Milestone 2**

**By 2005, immediate health threats will be eliminated and long-term cleanup will be underway at 85 percent of the estimated 3,200 Superfund sites (NPL and non-NPL) expected to require cleanup.**

This milestone is more difficult to understand than the one before. Will the public understand "immediate health threats," or are there alternative words that will give the same message? As with the previous milestone, this milestone should be ideal for opportunities to interact with the private sector, and the ability to track results should be straightforward and reasonable.

### **A.10.3 Milestone 3**

**By 2005, at least 10 percent of contaminated federal lands currently on the National Priorities List will be cleaned up.**

This milestone mentions radioactive wastes but does not provide sufficient detail. As with other milestones, this one appears not to include any judgment about the magnitude of threat posed by various sites, so cleaning up a site with minimal threat can be counted to be just as much a success as cleaning up a major threat. Note that the graph is shown in terms of number of sites, not percent, which causes initial confusion between the 16 sites and the 10% cleanup target. As with Milestone 5 of Goal 9, the target seems modest in comparison with the 95% target for non-Federal Superfund Sites in Milestone 1. Why should it be easier to accomplish cleanups at those sites not clearly the responsibility of the Federal Government?

### **A.10.4 Milestone 4**

**By 2005, stabilization to prevent the spread of contamination will be under way or final cleanup completed at 100 percent of operating industrial waste facilities where people have been exposed to contamination. Seventy-five percent of all facilities estimated to require cleanup will be stabilized or cleaned up.**

The word "cleaned-up" in the milestone may be subject to different interpretations. It may be more appropriate to use "will be remediated to achieve the risk reductions necessary to reuse the sites".

#### **A.10.5 Milestone 5**

**By 2005, cleanups will be completed at 200,000 leaking underground storage tank sites—double the 1994 figure.**

The milestone and supporting discussions are clear.

#### **A.10.6 Milestone 6**

**By 2005, radioactivity will be cleaned up or contained at 6 percent of sites contaminated by radioactivity.**

The use of the EPA, DOE and NRC data bases presented seems appropriate for this milestone.

Once again, the target seems modest in comparison to other targets where the cost/benefit equation may be similar or less favorable. The cited problem regarding limited places to store radioactive wastes is true but is not primarily a technical one and could be resolved with an aggressive program to resolve the sociopolitical roadblocks. Is the assertion about few cleanup technologies true? Physical removal is always an option. The fact that it may not be cost-effective is not the same as it not being available. Shifting the blame to DOE, DOD, and NRC for schedule problems in the Strategy section does not seem consistent with the idea that the document presents national goals, not just EPA ones.

#### **A.10.7 Milestone 7**

**By 2005, point sources of contamination will be controlled in 10 percent of the watersheds where sediment contamination has currently been determined to be widespread.**

Protecting and restoring sediments in rivers and lakes are essential elements of maintaining a healthy aquatic ecosystem. EPA's efforts to modestly control point sources is a very good beginning.

### **A.11 Goal 11- Reducing Global and Transboundary Environmental Risks**

**The United States and other nations will eliminate significant risks to human health and ecosystems arising from climate change, stratospheric**

**ozone depletion, and other environmental problems of concern at the transboundary and global level.**

This goal is to eliminate significant risks to human health and ecosystems from climate change, stratospheric ozone depletion, and other global and transboundary environmental problems. This seems to be an unrealistic goal, because eliminating these risks is impossible globally given population growth and economic development in other parts of the world, even if the developed countries meet the goal. Perhaps reducing these risks to some specified level would be better.

In the discussion of transboundary pollution on page 161, the work of the Commission on Environmental Cooperation, and the International Joint Commission of U.S. and Canada, should be noted. These groups have traditionally addressed many of the major issues considered in this document from the perspective of developing strategies and plans for the entire North American Continent.

**A.11.1 Milestone 1**

**By 2005 and beyond, U.S. greenhouse gas emissions will be reduced to levels consistent with international commitments agreed upon under the Framework Convention on Climate Change, building on initial efforts under the Climate Change Action Plan.**

This is a worthy milestone and the discussion is fine. However, the description of data sources to be used for this milestone are quite general and they should be more specifically identified.

**A.11.2 Milestone 2**

**By 2005, ozone concentrations in the stratosphere will have stopped declining and will have slowly begun the process of recovery.**

This is a worthy milestone and the discussion is fine.

**A.11.3 Milestone 3**

**By 2005, atmospheric concentrations of the ozone-depleting substances CFC-11 and CFC-12 will peak at no more than 332.4 and 572.3 parts per trillion, respectively.**

This is a worthy milestone and the discussion is fine.

#### **A.11.4 Milestone 4**

**Through 2005, with the exception of HCFCs and very limited "essential uses," there will be no U.S. production of ozone-depleting substances.**

The milestone and supporting discussions are clear.

#### **A.11.5 Milestone 5**

**By 2005, cooperative efforts between the U.S. and other countries will restrict the net loss of coral ecosystems to no more than 20 percent of the world's current reef area.**

This discussion states that without ecosystem management 40% of coral reef areas will be lost by 2005, compared with 10% loss today. This number seems very high. (It is only 8 years away.) So either this is an overestimate of the expected loss or the milestone is set too low.

#### **A.11.6 Milestone 6**

**By 2005, the United States and other countries will reduce the risks to human health and the environment associated with aldrin, chlordane, dieldrin, DDT, endrin, heptachlor, toxaphene, hexachlorobenzene, mirex, PCBs, and chlorinated dioxins and furans.**

The goal of this milestone, to reduce the global content of a list of several chemicals currently banned in the U.S., is reasonable and consistent with current thinking. However, while a noble goal, there seems little possibility of international success without incentive to developing countries, lest the U.S. be viewed as interfering with their right to a prosperous and cheap economy.

This Milestone 6 (p. 151) about reducing global insecticide use should explicitly mention preserving and improving public health.

#### **A.11.7 Milestone 7**

**By 2005, global air emissions of mercury will be reduced, in part through a 50 percent reduction from 1990 levels in the United States.**

There is no formal mechanism or a strategy in place yet to achieve the milestone. However, the Committee notes the draft Agency Mercury report to Congress as a good starting point to reach this milestone.

#### **A.11.8 Milestone 8**

**By 2005, with U.S. leadership and cooperation many nations will have phased out the use of lead in gasoline, and worldwide use of lead in gasoline will be below 1993 levels.**

The milestone target is clear, and the uncertainty of its achievement is recognized. However, a strategy or list of actions should be developed to resolve the ambiguities.

#### **A.11.9 Milestone 9**

**By 2005, all seven nonattainment areas along the United States/ Mexico border area will have met ambient air quality health standards for particulate matter, sulfur dioxide, carbon monoxide, and ozone during the preceding 4 years.**

This milestone is well presented and raises a good point. For air pollution, in general, San Diego is not a border community, but for ozone, for example, transport of pollutants may occasionally have an effect on U.S. air quality.

The obvious deficiencies here are that nothing is said about a) how standards differ between the US and Mexico (if they do), b) how to achieve the reductions, or c) whether or not there are any agreements in place between the US and Mexico.

#### **A.11.10 Milestone 10**

**By 2005, the United States and Canada will reduce sulfur dioxide and nitrogen oxide emissions that cause acid rain. U.S. sulfur dioxide emissions will be reduced by nearly 10 million tons and nitrogen oxide emissions by more than 2 million tons from 1980 levels.**

This is a worthy milestone and the discussion is one of the best in exposition.

#### **A.11.11 Milestone 11**

**By 2005, existing sources of high-level radioactivity in northwest Russia with the potential for near-term release into the arctic environment will be reduced by 25 percent.**

This milestone is much more specific in geographic scope than the other milestones. The text alludes to the vulnerability of Alaska to the release of the northwestern Russia radionuclides, but does not state what the impacts might be, other than the perception of radionuclide contamination in sea foods. Although perceptions are important, and could affect Alaska economically and psychologically, this discussion needs to be improved to justify placing this milestone at the same level of prominence as reducing the level of greenhouse gas production. The Committee does not agree with the comment on page D-14 of the draft Goals document that it should be dropped as outside EPA's jurisdiction.

#### **A.12 Goal 12 - Empowering People with Information and Education and Expanding Their Right to know**

**Americans will be empowered to make informed environmental decisions and participate in setting local and national priorities.**

Strategy -- The discussion here is well done

Two premises are listed on page 165; "right to know" and "help citizens make informed decisions". The second should be broken into two parts so as to yield three premises. Citizens need to be able to make informed decisions for themselves and for their communities. They also need to become informed participants in public discourse about environmental matters at both a local/regional and a national level. Being an informed participant in public discourse is not quite the same thing as making a decision. Often it is not clear what should be done, and the decision emerges only after extended discourse among informed discussants who have different perspectives. This enabling of discourse which underlies the democratic process deserves to be made explicit.

The discussion in the second paragraph on page 165 notes the tradeoffs that arise in environmental decision making when, for example, a decision related to emissions control in one medium (e.g. air) has impacts on emissions in another medium (e.g. water). However, the point is much broader and should be discussed in that broader context. Environmental quality is only one of the desiderata for which our society strives. There clearly are minimum levels which we simply insist upon as a matter of right, but at some stage it becomes necessary to consider and balance a variety of different social objectives, of which environmental quality is just one. Helping



people to understand the need for such balancing, and the subtle and complex ways in which our various social objectives are interrelated and affect each other, is a critical element in the process of helping people to become informed participants in public discourse.

Chapter 12 is focused, rather single-mindedly, upon getting the data out to people. This is an important goal. However, making information intelligible and useful is every bit as important as making it easily accessible. Thus, for example, the usefulness of the environmental indicators discussed in Milestone 1 (p. 168) will depend critically on how well the inputs are chosen, combined and explained to users. The utility of the expanded TRI data that are discussed in Milestone 2 (p. 190) will depend upon how easy it is to combine them (even qualitatively) with exposure and toxicity information. The utility of the one-stop data source discussed under Milestone 4 (p. 171) would be increased considerably if clear, easily understood information on "data pedigree" were included with the raw numbers to give the reader some idea of how good or bad the numbers are and how they should and should not be used.

The discussion of education (p. 166 and 172) talks about helping people get to the point that they can "analyze complex environmental issues". While one could certainly argue that understanding is implicit in analysis, the document should talk explicitly about helping people to understand complex environmental issues.

#### **A.12.1 Milestone 1**

**By 2005, current, accurate, and easily accessible information on environmental conditions will be available for at least 75 of the largest metropolitan areas.**

The choice of measures one adopts to report environmental conditions has important consequences for what gets attention. If the objective is to move the nation towards better and more cost-effective environmental control, the information that gets reported for the 75 largest metropolitan areas needs to be selected so as to focus attention on the most important environmental problems.

#### **A.12.2 Milestone 2**

**By 2005, the public's right to know what materials are released in their communities will be more fully addressed by the collection and publication of more comprehensive measures of the pollution sources.**

This milestone's objective of expanding the coverage of TRI is not sufficiently ambitious. While retaining the current lower cutoffs, so that small players do not have to report, TRI requirements would be extended to cover all industry so that a comprehensive picture of emissions can be assembled, and used to systematically perform such tasks as linking TRI to economic input/output analysis without there being gaping holes across large sectors of industrial activity. If the objective is "know what material is released" one has to include all major sources. Thus, the goal should not be "more comprehensive measures" but "comprehensive measures".

### **A.12.3 Milestone 3**

**By 2005, Americans will have improved environmental information about the products and chemicals they use, including data on toxic effects such as hormonal, reproductive, growth, and developmental risks.**

This milestone talks of assessing environmental risks. While comparisons may be an implicit part of assessment, the comparison of risks should be explicitly mentioned in the context of this Milestone. Given the many risks we face, and the many other social objectives we strive for, in addition to environmental quality, risk decision making must involve a comparative process so that we do not misallocate individual and societal resources by adopting too narrow a decision perspective.

### **A.12.4 Milestone 4**

**By 2005, more information on environmental programs will be publicly available, including one-stop access to and reporting of this information. EPA will make 90 percent of its databases with raw environmental data and 100 percent of its major reports, policy statements, and *Federal Register* notices available electronically.**

In the discussion of this milestone, it would be appropriate to make some reference to the need to coordinate with other Federal agencies.

### **A.12.5 Milestone 5**

**By 2005, there will be substantial growth in the number and quality of environmental education programs in schools, colleges, and communities.**

This is a highly desirable objective, but is unlikely to be achieved without significant infusions of resources.

#### **A.12.6 Milestone 6**

**By 2005, nations will be better able to share information on the transport of pollutants and the movement of hazardous and toxic materials across borders.**

This too is a highly desirable objective. It would be strengthened if more information about how the task will be accomplished were included.

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# **AN SAB REPORT: REVIEW OF ENVIRONMENTAL GOALS FOR AMERICA**

**A REVIEW BY THE ENVIRONMENTAL  
GOALS SUBCOMMITTEE OF THE  
SCIENCE ADVISORY BOARD**