

EPA IMPROVED SCIENCE-BASED ENVIRONMENTAL STAKEHOLDER PROCESSES

A COMMENTARY BY THE EPA SCIENCE ADVISORY BOARD



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

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OFFICE OF THE ADMINISTRATOR
SCIENCE ADVISORY BOARD

The Honorable Christine Todd Whitman
Administrator
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

SUBJECT: Improved Science-Based Environmental Stakeholder Processes:
An EPA Science Advisory Board Commentary

Dear Governor Whitman:

In October of 1999, the Executive Committee of the EPA Science Advisory Board sent a brief Commentary to Administrator Browner in which we “enthusiastically support(ed) the Agency’s efforts to develop and promote new, more flexible, adaptive approaches to environmental regulations” but expressed concern about the extent to which group stakeholder decision processes are able to perform a “full and careful consideration of all available science.” We indicated that we planned a series of workshops and deliberations with the objective of: a) better understanding the way in which scientific and technical knowledge is being developed and used in stakeholder processes; and b) identifying strategies that might allow such knowledge to be better developed and used in these processes in the future.

The enclosed Commentary, “Improved Science-Based Environmental Stakeholder Processes,” reports the results of that effort. We found that the terms “stakeholder” and “stakeholder process” are remarkably elastic. Our recommendations are directed at processes in which participants such as non-expert and semi-expert citizens, representatives of environmental non-governmental organizations, corporations, and other private parties are asked to: define or frame a problem; obtain feedback in order to better inform decision-makers about proposed alternative courses of action; develop and elaborate a range of options and/or criteria for good decision-making that a decision-maker might employ; or either explicitly or implicitly, actually make environmental decisions. Properly conducted in those contexts, stakeholder processes can be valuable in supporting high-quality science-based environmental decisions.

To be effective, science-based environmental stakeholder processes require substantial financial resources and high-quality staff who are available to provide ongoing support to participants on an iterative basis. Thus, at least in the short run, good science-based stakeholder processes are typically *more* expensive than conventional environmental decision processes. They are *not* a low-cost alternative to conventional processes.

There are many problems for which stakeholder processes, of the kinds we have addressed, are not appropriate. Limitations in data, analytical capabilities, or Agency resources

can result in pressures to expand inappropriately the use of these methods. Such pressures should be resisted since over-use and misuse hold the potential to yield decisions that are not well founded in relevant science, commit scarce resources unwisely, and sometimes lead to decisions that do not reflect a full consideration of the broad public interest. Over-use could give these techniques a bad name and undermine their use in those settings in which they can be most valuable.

Our Commentary makes seven specific findings listed in the attached table and then recommends that your office would be well advised to take two actions:

- a) Develop brief guidance to the Agency on the appropriate use of stakeholder processes of the types we have addressed. When a unit within EPA proposes to use a group stakeholder process for such purposes, it should be asked to: 1) justify the decision in a fashion that addresses the seven findings of this report together with any other concerns the Agency considers appropriate; 2) base the proposed methods on a careful reading of available literature; 3) propose a specific strategy for evaluation, both during and after the completion of the process.
- b) Direct the Office of Research and Development, in collaboration with the Program in Decision, Risk and Management Science at the National Science Foundation, to undertake an extramural program of experimental and field (case) studies designed to develop improved methods and tools for the use and evaluation of science-based environmental stakeholder processes.

We would be happy to meet with you or your staff to discuss this report and its implications, if that would be useful. We look forward to your response to this Commentary.

Sincerely;

/ Signed /

Dr. William Glaze, Chair
EPA Science Advisory Board

/ Signed /

Dr. Granger Morgan, Chair
New Approaches Working Group
EPA Science Advisory Board

TABLE OF FINDINGS

This Table lists the seven findings from the SAB Commentary “Improving Science-Based Environmental Stakeholder Processes.”

Finding 1	An adequate treatment of science is possible in stakeholder processes, but typically only if substantial financial resources, adequate time, and high-quality staff are available from the outset to allow the necessary deliberation and provide the necessary support on an iterative basis through ongoing interaction with the stakeholders. Absent such resources, stakeholder decision processes, of the types considered in this commentary, frequently do not do an adequate job of addressing and dealing with relevant science.
Finding 2	While staffing arrangements should be tailored to the needs of specific stakeholder groups, it is often better to support a stakeholder process with a single balanced team of expert staff rather than give each stakeholder group a budget to go out and retain their own experts.
Finding 3	If group stakeholder processes, of the types considered in this Commentary, are to result in environmental decisions that are adequately informed by science, participants in those processes must share a commitment to explore the implications of <i>all</i> relevant science, and a willingness to reframe the problems they address when scientific evidence leads in unanticipated directions.
Finding 4	While stakeholder processes can appropriately be used as a vehicle for framing issues and clarifying and informing decisions to be made by EPA and other regulatory decision-makers in a wide variety of settings, they should be used judiciously and with sensitivity to the fact that they can impose substantial burdens on the very limited human and financial resources available to non-governmental organizations and local community groups.
Finding 5	Using stakeholder process, either explicitly or implicitly, to make regulatory decisions - as opposed to using them as a source of input to decisions made by regulators - should be undertaken with great care. If it is to be done at all, it can appropriately be applied to only a modest subset of environmental regulatory decisions in which: <ul style="list-style-type: none"> a) adequate staff, generous financial resources, and sufficient time are available to provide expert support on an iterative basis; b) parties are willing to adapt their thinking and the problem formulation to the scientific evidence as it becomes understood; c) the problem being addressed involves a small number of well identified affected parties who can <i>all</i> be made party to the decision process; d) a vehicle is provided for obtaining input from other interested but unaffected parties, including members of the general public, and e) the legally authorized regulatory entity, such as EPA or a state or local agency, explicitly retains a right to review, and if necessary, modify or reject the decision.
Finding 6	If and when a stakeholder process is to be used <i>as the vehicle for decision-making</i> , great care must be taken to assure that all relevant interests are represented in a full and balanced manner. Only then can modest ambiguities involving fact-value tradeoffs be allowed to persist without risking serious errors in outcome. Most environmental decisions cannot properly be framed as a negotiation among a modest number of well-identified stakeholders.
Finding 7	The EPA should explore the development and appropriate use of randomly selected (i.e., disinterested jury-like) groups of members of the general public as a vehicle to obtain advice and insight about public views to assist the Agency in environmental decision-making in the public interest.

NOTICE

This report has been written as part of the activities of the EPA 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 related to problems facing the Agency. This report has not been reviewed for approval by the Agency and, hence, 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.

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EPA-SAB-EC-COM-00-002, October 7, 1999

Appendix B--Summary of the Four Workshops Conducted by the SAB Executive Committee on the Role of Science in Stakeholder-based Environmental Decision Processes

Appendix C--Thomas C. Beierle, "The Quality of Stakeholder-Based Decisions: Lessons from the case study record," Discussion Paper 00-56, Resources for the Future, Washington, DC, November 2000

Appendix D--Peter S. Adler, Robert C. Barrett, Martha C. Bean, Juliana E. Birkhoff, Connie P. Ozawa and Emily B. Rubin, "Managing Scientific and Technical Information in Environmental Cases: Principles and practices for mediators and facilitators," a study co-sponsored by RESOLVE Inc., the U.S. Institute for Environmental Conflict Resolution and the Western Justice Center Foundation, Washington, DC, Fall 2000

Appendix E--Gail Charnley, "Democratic Science: Enhancing the Role of Science in Stakeholder-Based Risk Management Decision-Making," Health Risk Strategies, Washington, DC, July 2000.

1. EXECUTIVE SUMMARY

This Commentary is based on a series of workshops and deliberations conducted by the Executive Committee on EPA's Science Advisory Board with the objective of addressing two questions. How well is scientific and technical knowledge being developed and used in group stakeholder processes? What strategies might allow such knowledge to be better developed and used in these processes in support of high-quality science-based environmental decisions? By the latter, we mean decisions that:

- a) are based on a careful and complete review and critical evaluation of the available scientific evidence;
- b) are based on an analysis of that evidence according to well-established methods and practice in decision and policy science; and
- c) combine the resulting scientific understanding and insights with an appropriate set of value judgments that reflect public preferences and EPA's obligation to protect environmental health and welfare.

The definitions of the terms "stakeholder" and "stakeholder processes" have become highly elastic. Indeed, these words are sometimes used to refer to any interaction with groups outside the agency, or even to the involvement of experts or others within the agency. This commentary is concerned with group processes in which the participants include non-expert and semi-expert citizens, and/or representatives of environmental non-governmental organizations, corporations and other private parties. We focus on processes in which such groups are asked to: define or frame a problem; develop feedback in order to better inform decision-makers about proposed alternative courses of action; develop and elaborate a range of options and/or criteria for good decision-making which a decision-maker might employ; or, either explicitly or implicitly, actually make environmental decisions.

Over the past fourteen months, the Executive Committee has conducted four workshops and a small working group has reviewed a variety of literature and held extended deliberations. We find that properly conducted, stakeholder processes of the types we have considered can be valuable in supporting high-quality science-based decisions. They are most useful when they are employed to define or frame a problem; to obtain feedback in order to better inform decision-makers about proposed alternative courses of action; or to develop and elaborate a range of options and/or criteria for good decision-making that a decision-maker might employ.

To be effective, these kinds of science-based environmental stakeholder processes require substantial financial resources and high-quality staff who are available to provide ongoing support to participants on an iterative basis. Thus, at least in the short run, good science-based stakeholder processes are typically more expensive and time-demanding than conventional environmental decision processes. They are not a low-cost alternative to conventional processes. Participants in successful stakeholder decision processes must share a commitment to explore the implications of all relevant

science, and a willingness to re-frame the problems they address when scientific evidence leads in unanticipated directions.

There are many problems for which stakeholder processes, of the kinds that we are addressing, are not appropriate. Limitations in data, analytical capabilities, or agency resources can result in pressures to expand inappropriately the use of these methods. Such pressures should be resisted since over-use and misuse hold the potential to yield decisions that are not well founded in relevant science, commit scarce resources unwisely, and sometime lead to decisions that do not reflect a full consideration of the broad public interest. Over-use could give these techniques a bad name and undermine their use in those settings in which they can be most valuable. Processes which, either explicitly or implicitly, are used to actually make, rather than inform, decisions can be potentially problematic and require particular attention. In addition to using processes that involve affected parties, the EPA should explore the development and use of processes that draw upon randomly selected (i.e., jury-like) groups of members of the general public as a vehicle to obtain advice on environmental decision-making in the public interest.

The report makes seven specific findings (listed in Table 1) and then recommends that the Administrator would be well advised to take the following two actions:

- a) develop brief guidance to the Agency on the appropriate use of stakeholder processes in which groups are asked to work together to: define or frame a problem; develop feedback in order to better inform decision-makers about proposed alternative courses of action; develop and elaborate a range of options and/or criteria for good decision-making which a decision-maker might employ; or, either explicitly or implicitly, actually make environmental decisions. When a unit within EPA proposes to use a group stakeholder process for such purposes, it should be asked to: 1) justify the decision in a fashion that addresses the seven findings of this report together with any other concerns the Agency considers appropriate; 2) base the proposed methods on a careful reading of available literature; and 3) propose a specific strategy for evaluation, both during and after the completion of the process.
- b) direct the Office of Research and Development, in collaboration with the Program in Decision, Risk and Management Science at the National Science Foundation, to undertake an extramural program of experimental and field (case) studies designed to develop improved methods and tools for the use and evaluation of science-based environmental stakeholder processes.

TABLE I - TABLE OF FINDINGS

This Table lists the seven findings from the SAB Commentary “Improving Science-Based Environmental Stakeholder Processes.”

Finding 1	An adequate treatment of science is possible in stakeholder processes, but typically only if substantial financial resources, adequate time, and high-quality staff are available from the outset to allow the necessary deliberation and provide the necessary support on an iterative basis through ongoing interaction with the stakeholders. Absent such resources, stakeholder decision processes, of the types considered in this Commentary, frequently do not do an adequate job of addressing and dealing with relevant science.
Finding 2	While staffing arrangements should be tailored to the needs of specific stakeholder groups, it is often better to support a stakeholder process with a single balanced team of expert staff rather than give each stakeholder group a budget to go out and retain their own experts.
Finding 3	If group stakeholder processes, of the types considered in this Commentary, are to result in environmental decisions that are adequately informed by science, participants in those processes must share a commitment to explore the implications of <i>all</i> relevant science, and a willingness to reframe the problems they address when scientific evidence leads in unanticipated directions.
Finding 4	While stakeholder processes can appropriately be used as a vehicle for framing issues and clarifying and informing decisions to be made by EPA and other regulatory decision-makers in a wide variety of settings, they should be used judiciously and with sensitivity to the fact that they can impose substantial burdens on the very limited human and financial resources available to non-governmental organizations and local community groups.
Finding 5	Using stakeholder process, either explicitly or implicitly, to make regulatory decisions - as opposed to using them as a source of input to decisions made by regulators - should be undertaken with great care. If it is to be done at all, it can appropriately be applied to only a modest subset of environmental regulatory decisions in which: <ul style="list-style-type: none">a) adequate staff, generous financial resources, and sufficient time are available to provide expert support on an iterative basis;b) parties are willing to adapt their thinking and the problem formulation to the scientific evidence as it becomes understood;c) the problem being addressed involves a small number of well identified affected parties who can <i>all</i> be made party to the decision process;d) a vehicle is provided for obtaining input from other interested but unaffected parties, including members of the general public, ande) the legally authorized regulatory entity, such as EPA or a state or local agency, explicitly retains a right to review, and if necessary, modify or reject the decision.
Finding 6	If and when a stakeholder process is to be used <i>as the vehicle for decision-making</i> , great care must be taken to assure that all relevant interests are represented in a full and balanced manner. Only then can modest ambiguities involving fact-value tradeoffs be allowed to persist without risking serious errors in outcome. Most environmental decisions cannot properly be framed as a negotiation among a modest number of well-identified stakeholders.
Finding 7	The EPA should explore the development and appropriate use of randomly selected (i.e., disinterested jury-like) groups of members of the general public as a vehicle to obtain advice and insight about public views to assist the Agency in environmental decision-making in the public interest.

2. INTRODUCTION

2.1 Introduction

In November of 1997 the Executive Committee of the EPA Science Advisory Board held a planning retreat in Washington, D.C. At that retreat the Board decided to expand the set of self-initiated studies it undertakes in order to provide more strategic advice to the agency. As a result, standing committees of the SAB were encouraged to begin to identify and address issues that needed their special attention beyond their usual work of reviewing major agency reports. In addition, the Executive Committee of the SAB identified a number of such issues. The use of science in stakeholder processes quickly emerged as a topic warranting early attention.¹ In October of 1999, the Executive Committee sent a Commentary on this subject to the Administrator², in which we noted that:

- a) the SAB "enthusiastically support[s] the Agency's efforts to develop and promote new, more flexible, adaptive approaches to environmental regulations."
- b) involving representatives of specific interested or affected parties in environmental decision-making is clearly important;
- c) the Agency has a responsibility to represent the broad public interest;
- d) it is in the broad public interest to base environmental decisions on a "full and careful consideration of all available science."
- e) in "newer decision environments, which involve a greater focus on consultation and negotiation among directly involved stakeholders," there is a risk that this broad public interest could be frustrated and full consideration of all available science may receive too little attention in the interest of accommodating conflicting interests and perspectives.

Having stated both its support and this concern, the SAB went on to explain that it would run a series of workshops with the objective of better understanding the way in which scientific and technical knowledge is being developed and used in stakeholder processes, and to identify strategies that might allow such knowledge to be better developed and used in such processes in the future.

In the subsequent 14 months, in conjunction with their regular meetings, the SAB Executive Committee held four half-day workshops on this topic. Appendix 2 summarizes the agendas and speakers. At the first of these workshops, a group of Senior Agency staff was invited to offer suggestions and advice on the questions that should be addressed and on how we should proceed.

We have been greatly facilitated in our work by the fact that several groups have recently conducted extensive summary analyses of stakeholder processes that have included an examination of how scientific knowledge has been summarized and used. Thus, in each of the three workshops that followed, we were able to adopt the following format:

- a) a briefing on a summary analyses which had reviewed and assessed a large number of stakeholder processes.
- b) a series of "reports from the field" from a variety of people who had been participants in, or close observers of, specific stakeholder processes.

The presentations inevitably sparked extensive discussion that allowed Executive Committee members to explore a wide range of relevant questions.

In writing this report, we have chosen to focus on the bottom line, placing most supporting references and examples in endnotes so as to keep the report brief and easy to read. Additional supporting detail can also be found in the Appendices.

2.2 Environmental Decision-making

Before we turn to a summary of our findings, we provide some context with a few observations on the nature of environmental decision-making. Good environmental decision-making is a complex process which requires *both* a careful review and assessment of relevant science *and* a thoughtful application of social values.

When the US Environmental Protection Agency (EPA) was created in 1970, environmental problems were pretty obvious. Anyone who traveled around the country could see them, smell them and taste them. The things that needed to be done were also pretty obvious: set standards to reduce emissions and then push hard to get them enforced. Over the years, the nature of environmental problems in the United States has evolved. Most of the more obvious problems have been brought under control. Today's problems are more subtle. They involve complex and uncertain scientific evidence and involve difficult societal value judgments and tradeoffs.³ To address such problems, environmental decision-makers must have access to substantial technical and scientific resources, and the support of strong decision-science and policy analytic skills informed by social and natural science as well as engineering.

It has become popular to talk of "science-based" environmental decision-making. While all good environmental decisions must be based in a careful consideration of the relevant science, science alone is not sufficient. Equally important are value judgments. Science rarely provides answers that are as precise as decision-makers would like. Even in an ideal world, where science could precisely describe all health and environmental damages in detail and accurately predict the costs and consequences of all proposed control actions, important value judgments would be required to choose the best level and pattern of environmental protection. In the real world, scientific understanding about important environmental issues is almost always incomplete. Thus, environmental decision-makers must also decide how to make decisions in the face of uncertainty. There is typically uncertainty about both

the nature and extent of the damages and the costs and consequences of proposed control actions. Again, deciding how to proceed, in the face of uncertainty, requires a value judgment.

The fundamental appeal of stakeholder-based decision processes lies in this necessity to make value judgments, informed by available scientific evidence. When and if representatives of the all relevant and interested parties, including the general public, can be brought together to clarify collectively and openly areas of agreement and disagreement, understand and apply the relevant science, and perhaps even reach consensus on how best to deal with an environmental problem, the result should be a decision that is both scientifically and socially sound.⁴

2.3 What is a "High-quality Science-Based Environmental Decision?"

What are the properties of a "high-quality science-based environmental decision?" As noted above, it is rare that science is as complete as environmental decision-makers would like. Nor is complete scientific understanding either necessary or sufficient for high-quality decision-making. As the agency charged with protecting the nation's environmental health and welfare, EPA cannot afford to wait for complete understanding before acting. When there is a plausible prospect that damage is occurring, or could occur, it is appropriate for EPA to take protective action.

Thus, by "high-quality science-based environmental decisions" we mean decisions that:

- a) are based on a careful and complete review and critical evaluation⁵ of the available scientific evidence;
- b) are based on an analysis of that evidence according to well-established methods and practice in decision and policy science; and
- c) combine the resulting scientific understanding and insights with an appropriate set of value judgments that reflect public preferences and EPA's obligation to protect environmental health and welfare.

2.4 What Is a "Stakeholder?"

In conducting this study, the SAB found that the term "stakeholder" has now been stretched to include almost any group imaginable. However, most dictionaries contain just a single definition for the term "stakeholder," a definition that does not include contemporary usage. A stakeholder is defined as:

n. one who holds money, etc. bet by others and pays it to the winner.

While this definition does not capture contemporary usage, it is subtly symbolic. Clearly, the stakeholder of the traditional dictionary definition should hold the interests of others in trust and be counted on to serve those interests in a fair and expeditious manner, on the basis of an objective assessment of the state of the world. By this definition, *the EPA is US society's stakeholder for environmental protection!*

The National Research Council (NRC) report *Understanding Risk*⁶ views stakeholders as including both "interested" as well as "affected" parties. In contrast, the EPA Agency-wide 2000 Public Involvement Policy⁷ adopts a narrower definition of stakeholder. It differentiates between "the public," by which it means any member of the general public; "stakeholders," by which it means that sub-set of people and groups "who have a strong interest in the Agency's work and policies;" and "affected parties," by which it means "individuals and groups who will be impacted by EPA policies or decisions."

We prefer the NRC's broader definition and will use it in this report because it is our belief that members of the general public – who may not be directly affected by, but as citizens certainly have, or with time and attention could develop, an interest in environmental decisions – should be included in any general consideration of stakeholder processes.

Stakeholder processes can be classified and used in several ways. At our March 2000 workshop, presenter Dr. Juliana Birkhoff, of the environmental dispute resolution firm RESOLVE Inc., noted that stakeholder processes may be used to:

- a) define or frame a problem;
- b) provide feedback to better inform decision-makers about proposed alternative courses of action;
- c) develop a range of options and/or criteria for good decision-making; or
- d) actually make decisions.⁸

While this Commentary uses a broader definition of "stakeholder" than the EPA draft Public Involvement Policy, we use a narrower definition of "stakeholder processes." We include as stakeholders non-expert and semi-expert citizens and citizen groups, independent of their initial degree of interest in the issues or the magnitude of the impacts they will experience, as well as representatives of environmental non-governmental organizations, corporations, and other private parties with economic or other interests in the decisions being made. However, we limit "stakeholder processes" to situations in which such groups *work together* to perform the four kinds of tasks listed in the paragraph above.

It turned out to be rather difficult to find examples of processes that involved representatives of the general public.⁹ This fact may reflect a problem with the design of many current processes.¹⁰ The participants in many of the cases that were first suggested as examples of stakeholder decision processes involve representatives from various insider and expert communities or people with material interest in the outcome. However, with some effort a wide range of examples was found, including a number which involved significant participation by members of the general public.

3. FINDINGS AND RECOMMENDATIONS

In our workshops, and our reading of the literature, we examined stakeholder processes that encompassed both our broad definition, of "interested and affected parties" as well as the narrower definition of "affected parties." Except where noted, the findings and recommendations that follow apply to both. As previously noted, our recommendations are directed at group processes in which the participants include non-expert and semi-expert citizens, and/or representatives of environmental non-governmental organizations, corporations and other private parties in which the group is asked to work together to: define or frame a problem; develop feedback in order to better inform decision-makers about proposed alternative courses of action; develop and elaborate a range of options and/or criteria for good decision-making which a decision-maker might employ; or, either explicitly or implicitly, actually make environmental decisions.

3.1 An Adequate Treatment of Science is Possible

Among the specific cases we examined, we saw a number of examples of stakeholder processes that effectively reviewed and used relevant science in their deliberations.¹¹ All of these examples had three things in common:

- a) high-quality staff available to summarize and interpret the science;¹²
- b) a process that gave stakeholders the time and support needed iteratively to refine and reshape the scientific questions that staff were asked to address¹³ and develop new questions as participants' understanding of the issues evolved;¹⁴ and
- c) substantial resources to support the review of relevant scientific evidence and the development of summary scientific materials in a form that was intelligible to the stakeholders.

Unfortunately, these three conditions were not present in many of the stakeholder processes we reviewed.¹⁵

Finding 1: An adequate treatment of science is possible in stakeholder processes, but typically only if substantial financial resources, adequate time, and high-quality staff are available from the outset to allow the necessary deliberation and provide the necessary support on an iterative basis through ongoing interaction with the stakeholders. Absent such resources, stakeholder decision processes, of the types considered in this Commentary, frequently do not do an adequate job of addressing and dealing with relevant science.

Adequate time is important both to allow stakeholders to understand fully the science and its implications, and to engage in a meaningful deliberative process with other participants.

By "high-quality staff" we mean staff who combine good technical understanding and analytical skills with an understanding of the broader decision context, good communication skills, and an ability to respond flexibly to, and support, the needs of the stakeholders. In a number of the successful examples that we examined, staff support also included one or more trained facilitators who could work constructively to support the progress of the group deliberations.

In fairness, we should note that more traditional decision processes also sometimes fail to do an adequate job of addressing and dealing with relevant science. In this context, Beierle¹⁶ appropriately asks: with what standard of decision-making should we be comparing stakeholder processes? He notes that studies of agency decision-making suggest that the status quo to which stakeholder processes are an alternative often also falls well short of the ideal of "expert-led scientific decision-making." While this observation has a "second-best" appeal, we take little comfort from it because the SAB is charged with "making a positive difference in the production and use of science in the Agency," independent of the decision process employed.¹⁷

3.2 Mechanisms for Technical Support

Careful thought must be given to designing the form that technical staff support should take for a particular stakeholder process. As discussed in paragraphs below, different arrangements are likely to best serve different circumstances. In a number of the most successful examples we reviewed, the set of stakeholders shared a common pool of supporting staff, as opposed to each being given resources to go off and commission their own separate experts. This approach appeared to have three advantages: it minimized the risk that deliberations would deteriorate into dueling experts; it built a sense of shared problem understanding; and it tended to focus the group on the necessary value choices, making it harder to hide behind the science.

Finding 2: While staffing arrangements should be tailored to the needs of specific stakeholder groups, it is often better to support a stakeholder process with a single balanced team of expert staff rather than give each stakeholder group a budget to go out and retain their own experts.

The issue of control is obviously important when the same staff is to be used by all participants, particularly because different participants often come to the proceedings with vastly different resources. In the best examples we saw, the group was able to agree collectively on what questions they wanted staff to address. Often those questions changed as the process proceeded and participants' understanding evolved. When the Agency is providing technical support, it is important to avoid the temptation to shape the proceedings by controlling the content of the technical support.

While there is good evidence that a shared staff and shared resources can be very beneficial in many stakeholder settings, the literature is not sufficiently clear to support the conclusion that this is always the best procedure. For example, there may be situations in which a topic has become so highly polarized that stakeholders cannot collaborate effectively. The Agency might still find it useful to arrange separate technical support for different stakeholders, and then seek input from each.

Respondents in an Environmental Law Institute interview-based study expressed mixed views on this topic.¹⁸ Many were probably most familiar with adversarial processes. It is not clear whether those who strongly supported expanded use of technical assistance grants to individual organizations had experience with processes which provide common technical assistance to all participating stakeholders. Similarly mixed views are reported in interview results in a study by Suzanton Associates.¹⁹ In both these cases, what is reported are opinions, not actual experimental findings, that compare different procedures for providing technical support.

3.3 The Need for Participant "Buy-In"

Our workshops identified examples in which difficulties arose because some of the participants came to the process with strong preconceptions about the nature of the problem. When a review of the science began to suggest that the problem should be reframed, difficulties arose, and in at least one case, key stakeholders walked out. Whether the problem being addressed is simple or complex, achieving "buy-in" by all participants is critically important.²⁰ If stakeholder decision processes are to be based in science, that "buy-in" must include a commitment by all participants to explore all relevant evidence and a willingness to reframe the problem if the science leads in unanticipated directions.

Situations can also arise in which it is to the advantage of some (or all) stakeholders to ignore selectively parts of the science, or to withhold information germane to the problem. The Agency itself is not immune to these impulses. In such situations, it is important that the process include some party with a strong commitment to honoring the full range of scientific evidence.²¹

Finding 3: If group stakeholder processes, of the types considered in this Commentary, are to result in environmental decisions that are adequately informed by science, participants in those processes must share a commitment to explore the implications of *all* relevant science, and a willingness to reframe the problems they address when scientific evidence leads in unanticipated directions.

3.4 Stakeholder Processes Are Not a Solution to all Environmental Problems

As we noted in our discussion of definitions, stakeholder processes can be used to achieve a number of objectives: a) to define or frame a problem; b) to obtain feedback in order to better inform decision-makers about proposed alternative courses of action; c) to develop and elaborate a range of options and/or criteria for good decision-making; or d) to actually make decisions.

The use of stakeholder processes to serve the first three of these objectives poses relatively few problems, since all parties understand that legally authorized regulatory decision-makers retain full responsibility for all decisions, and will use the results of the stakeholder involvement as just one of a number of inputs to inform their decisions.

However, many stakeholders, such as national environmental non-governmental organizations and local community groups, have very limited personnel available to participate in stakeholder processes. They simply do not possess enough personnel or other resources to support serious participation in more than a modest number of stakeholder processes at any one time.²²

Finding 4: While stakeholder processes can appropriately be used as a vehicle for framing issues and clarifying and informing decisions to be made by EPA and other regulatory decision-makers in a wide variety of settings, they should be used judiciously and with sensitivity to the fact that they can impose substantial burdens on the very limited human and financial resources available to non-governmental organizations and local community groups.

Studies of public participation have emphasized the importance of developing a climate of cooperation among participants, so that they are willing to consider alternative values and viewpoints and the possibility of surrendering a portion of their individual autonomy for the collective good. Trained facilitators can often be effective in helping to create such a climate. In their comparative evaluation of eight models for environmental discourse drawn from experience in Europe and the United States, Renn, Webler, and Wiedemann²³ propose that efforts to increase participation be coupled with structural incentives to foster and promote communitarian values. Such approaches, they argue, are likely to be seen as more legitimate when problems are largely technical, impacts uncertain and complex, and values in competition. Similarly, the National Research Council Report, *Understanding Risk*, in arguing for public participation as a form of broadly-based deliberation, saw a potential for enhanced decision-making by improving problem formulation, increasing shared knowledge, clarifying views, and increasing acceptability of decisions.

State agencies and the EPA often face many more mandates than they have resources to address adequately. In such situations it can be tempting to deal with the problem by handing it to a stakeholder group without providing significant resources. However, at least in the short run, good stakeholder decision-making is typically *more* not less resource intensive than conventional methods. When agencies face more mandates than they have resources to cover, they should discuss the problem publicly and frankly, and seek redress, either in the form of more resources, or in the form of more realistic mandates. Handing such problems off to stakeholders will not in general lead to decisions based on a full and careful consideration of all relevant science, and actually can compromise principles of democratic procedure.

When environmental decisions require tough and unpopular choices, regulatory agencies may be tempted to turn the problem over to a stakeholder process. Of course, strictly speaking the Agency

or other regulatory authority usually retains ultimate legal responsibility. However, when the output of a stakeholder process is implemented as a decision with little or no modification, the stakeholder process is being used, at least implicitly, to actually make decisions. Such cases require great care.²⁴

Finding 5: Using stakeholder process, either explicitly or implicitly, to make regulatory decisions - as opposed to using them as a source of input to decisions made by regulators - should be undertaken with great care. If it is to be done at all, it can appropriately be applied to only a modest subset of environmental regulatory decisions in which:

- a) adequate staff, generous financial resources, and sufficient time are available to provide expert support on an iterative basis;
- b) parties are willing to adapt their thinking and the problem formulation to the scientific evidence as it becomes understood;
- c) the problem being addressed involves a small number of well identified affected parties who can *all* be made party to the decision process;
- d) a vehicle is provided for obtaining input from other interested but unaffected parties, including members of the general public, and
- e) the legally authorized regulatory entity, such as EPA or a state or local agency, explicitly retains a right to review, and if necessary, modify or reject the decision.

There is one further issue that requires clarification, if and when stakeholder processes are to be used for decision-making. It is clear, both from the literature, and from the personal experience of many SAB members, that environmental conflicts often masquerade as arguments about science (i.e., about facts) when they are in actuality arguments about values.²⁵ This is not surprising, given the relatively privileged position that we give to science in environmental decision-making and the difficulty that many have in negotiating issues of value. As scientists, the initial instinct of most SAB members is to call for a sharp distinction between issues of fact and issues of value, as suggested in the so-called “Red Book” on risk.²⁶ However, while it is important that environmental decision-makers be clear about this distinction, we understand that practical political reality sometimes dictates a bit of public ambiguity and that assessing risks always involve value choices.

How explicit decision-makers can be is partly a function of evolving public understanding and accepted practice. For example, thirty years ago, most regulatory decision-makers were extremely reluctant to talk publicly about the fact that their decisions implied an implicit investment rate for life saving.²⁷ Today many agencies, such as National Highway Traffic Safety Administration and Federal Aviation Administration publish a target number and require that proposed regulations be evaluated against this target.

It can sometimes also be awkward, or even counterproductive, for parties in a negotiation to be too explicit about their values and objectives. While they should be clear in their own mind about fact/value distinctions, there is evidence in the literature on negotiation²⁸ that when different parties to a conflict have different, and multi-dimensional, objectives, progress toward a negotiated compromise may sometimes best be served by *not* being overly explicit about who is gaining, or giving up, what.

These observations impose an additional limitation on when stakeholder processes can appropriately be used for environmental decision-making:

Finding 6: If and when a stakeholder process is to be used *as the vehicle for decision-making*, great care must be taken to assure that all relevant interests are represented in a full and balanced manner. Only then can modest ambiguities involving fact-value tradeoffs be allowed to persist without risking serious errors in outcome. Most environmental decisions cannot properly be framed as a negotiation among a modest number of well-identified stakeholders.

In summary, then, pressures to expand inappropriately the use of stakeholder methods, in the ways outlined above, should be resisted since overuse holds the potential to yield decisions that are not well founded in relevant science and to place great burdens on non-governmental (NGO) and community groups. Over-use could give the technique a bad name and undermine its use in those settings in which it can be very valuable.²⁹

3.5 Involving the General Public

During the course of our review, we found relatively few examples of stakeholder processes that involved members of the general public, as opposed to stakeholders with well-developed specific interests. However, in as much as EPA's mission is to serve the broad public interest, and the greatest value of stakeholder processes is as a source of advice to decisions made by regulators, we believe that Agency decision-makers could find it very useful if they developed and used processes in which "jury-like" groups of representative members of the general public were asked to become knowledgeable about, and provide advice to the Agency on important environmental decisions. We use the phrase "jury-like" as a short hand to refer to representative groups of citizens chosen through some appropriate random process (which excludes interested parties), who are given the time and resources to understand and offer informed advice on an important regulatory issue. There has been considerable experience in both the United States and Europe with the development and use of such methods. This experience has demonstrated that, given adequate time and resources, lay groups can perform extremely well in such advisory capacities.³⁰

Finding 7: The EPA should explore the development and appropriate use of randomly selected (i.e., disinterested jury-like) groups of members of the general public as a vehicle to obtain advice and insight about public views to assist the Agency in environmental decision-making in the public interest.

4. AGENCY ACTIONS

On the basis of the preceding, we believe that the Administrator would be well advised to take two actions:

Recommendation 1: Develop brief guidance to the Agency on the appropriate use of stakeholder processes in which groups are asked to work together to: define or frame a problem; develop feedback in order to better inform decision-makers about proposed alternative courses of action; develop and elaborate a range of options and/or criteria for good decision-making which a decision-maker might employ; or, either explicitly or implicitly, actually make environmental decisions. When a unit within EPA proposes to use a group stakeholder process for such purposes, it should be asked to: a) justify the decision in a fashion that addresses the seven findings of this report together with any other concerns the Agency considers appropriate; b) base the proposed methods on a careful reading of available literature; c) propose a specific strategy for evaluation, beginning early in the process so as to capture baseline data and using evaluation to identify and improve participation programs during their implementation.³¹

The recent literature contains a number of very useful anecdotal guidelines and strategies to develop and use scientific knowledge effectively in stakeholder processes. In the short term, persons running stakeholder processes would be well advised to read these insights and draw upon them carefully in designing and conducting their process. In order to facilitate this, Appendix C, D, and E reproduce three recent studies, which, taken together, do an excellent job of summarizing the current state of knowledge.

However, while intuition and skill will certainly always be part of the operation of an effective stakeholder process, many important issues can be framed as researchable questions. This leads to our second recommendation:

Recommendation 2: Direct the Office of Research and Development, in collaboration with the Program in Decision, Risk and Management Science at the National Science Foundation, to undertake an extramural program of experimental studies, at a level of \$3 to \$5-million over the next five years, that is designed to build upon existing literature and systematically address the following questions:

- a) What are good strategies for developing and summarizing available scientific knowledge for use by non-technical and semi-technical participants in stakeholder processes?
- b) What are good strategies for introducing available scientific knowledge and assuring that it is adequately used in stakeholder processes involving non-technical and semi-technical participants?

- c) How can "representative" members of the general public (as opposed to those with special interests and expertise) be selected? When they are used in processes that also include interested parties, how can they be helped to retain their "representative" status as the process proceeds?
- d) How can stakeholder groups be assisted in understanding and dealing with the limits to scientific knowledge and with scientific uncertainty?
- e) What methods can best be used to evaluate the performance of stakeholder processes both during and after their operation?

We proposed that the research be done collaboratively with National Science Foundation Decision Risk and Management Science program because EPA lacks the necessary social science research skills to develop and perform such work on its own. We recommend an extramural program because there are a number of excellent applied social science research groups across the country and elsewhere which are well qualified to undertake such work. We recommend a funding level of \$3 to \$5-million over five years because it will require a minimum of \$1 to \$1.5-million for any one group to develop and perform the necessary experimental studies, and it will be important to have more than one group addressing several of these questions in order to have the benefits of multiple perspectives and approaches.

5. ACKNOWLEDGMENTS

We thank the many people who participated in the four workshops and provided us with extensive advice and comments. Most of their names are listed in Appendix 2. We extend particular thanks to Mr. Thomas C. Beierle, Dr. Juliana E. Birkhoff, and Dr. Gail Charnley for their briefings on studies they have conducted reviewing large numbers of stakeholder processes, and for their permission to reprint their reports in Appendices C, D, and E.

NOTES

1. For discussions of "new approaches" considered by the Board prior to its Commentary in 1999, see:

Pritzker, David M. and Deborah S. Dalton (eds.), 1995, *Negotiated Rulemaking Source Book*, Administrative Conference of the United States.

Davies, Terry and Jan Mazurek, 1996, *Industry Incentives for Environmental Improvement*, Resources for the Future, Washington, D.C.

National Academy of Public Administration, 1997, *Resolving the Paradox of Environmental Protection: An Agenda for Congress, EPA and the States*, Washington, DC.

United States General Accounting Office, 1997, *Regulatory Reinvention: EPA's Common Sense Initiative Needs an Improved Operating Framework and Progress Measures*, GAO/RCED-97-164.

United States General Accounting Office, 1997 *Environmental Protection: Challenges facing EPA's efforts to reinvent environmental regulation*, GAO/RCED-97-164.

Steinzor, Rena I., 1998, *Reinventing Environmental Regulation: The Dangerous Journey from Command to Self-control*, Harvard Environmental Law Review, v22, pp. 103-202.

US Environmental Protection Agency, 1998, *Reinventing Environmental Protection*, EPA100-R-99-002.

US Environmental Protection Agency, 1999, *The Common Sense Initiative: Lessons Learned*, EPA100-R-98-001.

2. Science Advisory Board, 1999, Science Advisory Board Commentary on the Role of Science in 'New Approaches' to Environmental Decisionmaking that Focuses on Stakeholder Involvement, EPA-SAB-EC-COM-00-002. This commentary is reproduced in Appendix 1.

3. See: U.S. Environmental Protection Agency, 1987, *Unfinished Business: A Comparative Assessment of Environmental Problems*, Washington DC; Science Advisory Board, 1990, *Reducing Risk: Setting Priorities and Strategies for Environmental Protection*, EPA-SAB-EC-90-021, 1990; and Science Advisory Board, 2000, *Toward Integrated Environmental Decision-Making*, EPA-SAB-EC-00-001.

4. Stern, Paul C. and Harvey V. Fineberg, Editors, 1996, *Understanding Risk: Informing Decisions in a Democratic Society*, Committee on Risk Characterization, National Research Council, Washington, D.C.

5. Critical evaluation is essential. While it is not correct to characterize most incomplete science as "junk", it is also the case that scientific findings can vary substantially in quality, and the amount of weight they are given in decision-making should be weighted by their quality.

6. See Stern and Fineberg, *Understanding Risk: Informing Decisions in a Democratic Society*.

7. U.S. Environmental Protection Agency, 28 December 2000, *Draft Public Involvement Policy*, FRL-6923-9, 82335-82345.

8. Note that these objectives for stakeholder processes are quite different from those for the peer review of scientific or analytical products. The latter requires the considered critical judgment of experts.

9. Thomas Beierle (Appendix 3, page 16) notes that "there is a tendency to assume that the citizens participating in environmental policy decisions are laypeople rather than experts. Yet the capacity that participants bring to the table can often be quite impressive..." In the 239 case studies he reviewed, he observes that "...in roughly 40% of the cases for which data ...[were] available, there was a significant level of technical capacity among most of the participants. In another roughly 45%, there were at least some participants with significant technical capacity who could act as internal technical resources for the rest of the group. In the remaining cases, participants had little overt technical or issue-related expertise. It is only to this last 15% that the label 'lay public' most appropriately applies."

10. Kasperson, Roger K., 1986, *Six propositions on public participation and their relevance for risk communication*, Risk Analysis, 6 (No.3), 275-281.

11. The Microbial/Disinfectant By-product Federal Advisory Committee convened by the Office of Ground Water and Drinking Water was illustrative of an activity in which adequate resources and dedicated staff were committed to the support of a deliberative process. Despite the fact that the issue was complex and there were several vested interests, the process was brought to a successful conclusion. An equally important factor was that the groups represented on the committee appeared to recognize that it was in their own interest to come to a resolution. The uncertainties on the scientific basis available for decision-making were such that any one of these groups could have staked out an unreasonable position.

In contrast, the Snake River TMDL activity never came to clear resolution. In part, the failure of the process appeared to be due to the failure of the Agency to commit sufficient resources early in the process. The discussion of the project raised the issue of whether most of the parties with an interest were committed to coming to a common agreement or were simply to defending their own interests. More up-front investment of resources may have lead to a better definition of the problem to be resolved and drawn in stakeholders. Alternatively, a conclusion could have been reached that this was not a problem that could be dealt with by a stakeholder process.

12. In their report, "Building Capacity to Participate in Environmental Protection Agency Activities: A needs assessment and analysis" (1999) the Environmental Law Institute notes that some of the groups and individuals they interviewed in their study "strongly emphasized the need for more technical assistance, because of the technical nature of EPA decisions. They thought that EPA should not shift the burden to perform technical analysis to citizens and communities – the agency should translate citizen concerns into technical terms rather than require citizens to assume that responsibility..."

13. Sequential processes in which staff summarize the science without subsequent iteration have frequently not been very successful. While staff needs to get stakeholders familiarized with the broad range of relevant science, stakeholders need to be able to frame questions and ask staff for analysis which is responsive to their specific questions and concerns.
14. In place-based processes, it is also important to note that participants can sometimes bring in local knowledge which might otherwise be overlooked.
15. See two useful reviews of different types of public participation: Fiorino, Daniel, 1990, *Citizen Participation and Environmental Risk: A Survey of Institutional Mechanisms*, Science, Technology, and Human Values, 15 (No.2), 226-243 and Creighton, James L, Jerome Delli Priscoli, and C. Mark Dunning, 1998, *Public Involvement Techniques: A Reader of Ten Years Experience at the Institute for Water Resources*, IWR Research Report 82-R1, Alexandria Virginia: The Institute.
16. See page 29 of Appendix 3.
17. This discussion raises the broader question of how one should measure the "quality" of the decisions made by either conventional or stakeholder decision processes. While Beierly developed and used a measure in his study, this topic deserves considerable additional attention. Accordingly, it is included as one of the research objectives in our Recommendation 2.
18. Environmental Law Institute, 1999, *Building Capacity to Participate in Environmental Protection Agency Activities: A Needs Assessment and Analysis*.
19. Suzanton Associates, 1991, *Attitudes Toward Regulatory Negotiation*, National Institute for Dispute Resolution and the Environmental Protection Agency.
20. This conclusion is echoed in "Best Practices for Government Agencies: Guidelines for using collaborative agreement-seeking processes," Society of Professionals in Dispute Resolution, Washington, DC, 1997.
21. Because they have been appointed to represent the broad public interest, state or federal regulators should play this role, although sometimes they too may find it convenient to use the science selectively. In some circumstance, it may be possible to arrange for academic or other expert participants to play this role.
22. A good example of both appropriate and inappropriate uses of stakeholder groups is provided by the need to develop 40,000 TMDLs. While it is sometimes appropriate to involve stakeholders in addressing the problem of how to allocate allowed pollution loads, it is not appropriate to ask stakeholder groups, acting on their own, to assess the data and models used in establishing those loads, nor is it reasonable to expect that environmental NGOs will be able to produce participants for more than a modest set of the most important decisions.

23. Renn, Ortwin, Thomas Webler, and Peter Wiedemann, 1995 *Fairness and Competence in Citizen Participation; Evaluating Models for Environmental Discourse*, Dordrecht: Kluwer.
24. For a somewhat different discussion of the settings in which non-expert stakeholder processes should and should not be applied see: Chess, Caron , Thomas Dietz and Margaret Shannon, "Who Should Deliberate When?" *Human Ecology Review*, 5, 45-48, 1998; Terry F. Yosie and Timothy D. Herbst, 1998, *Using Stakeholder Processes in Environmental Decision Making: An Evaluation of Lessons Learned, Key Issues, and Future Challenges*," Ruder Finn Inc., Washington, DC; and Society of Professionals in Dispute Resolution, 1997, *Best Practices for Government Agencies: Guidelines for Using Collaborative Agreement-seeking Processes*, Society of Professionals in Dispute Resolution, Washington, D.C.
25. See Stern and Fineberg, *Understanding Risk: Informing Decisions in a Democratic Society*, 49, and Renn et al.
26. National Research Council, 1983, *Risk Assessment in the Federal Government: Managing the Process*, National Academy Press.
27. See for example: Tengs, Tammy O., et. al., 1995, *Five-hundred Life-saving Interventions and Their Cost Effectiveness*, *Risk Analysis*, 15, 369-390.
28. Raiffa, Howard, 1982, *The Art and Science of Negotiation*, Belknap Press of Harvard University Press.
29. For an overview, see: Lynn, Francis M., and George J. Busenberg, 1995, *Citizen Environmental Committees and Environmental Policy: What We Know, What's Left to Discover*, *Risk Analysis*, 15, 147-162; and Stern and Fineberg, *Understanding Risk: Informing Decisions in a Democratic Society*, Appendix B. Also see the useful discussion of the "complications" of public participation, particularly limits and problems relevant to this point in Renn et al., 1995, . 28-29.
30. For an overview, see: Crosby, Ned , 1995, *Citizen Juries: One Solution for Difficult Environmental Questions*, in Renn et. al (1995), 157-174 and Armour, Audrey, 1995, *The Citizen's Jury Model of Public Participation: A Critical Evaluation*, in Renn et al., 1995, . 175-188. For a discussion of how such groups might be selected see: Morgan, M. Granger, Baruch Fischhoff, Lester Lave, and Paul Fischbeck, 1996, *A Proposal for Ranking Risk within Federal Agencies*, in *Comparing Environmental Risks: Tools for setting government priorities*, J. Clarence Davies (ed.), 111-148, Resources for the Future, Washington, D.C.
31. For a discussion of evaluation criteria and process, see Roger E. Kasperson, *Evaluating Risk Communication*, in *Effective Risk Communication: The Role and Responsibility of Government*, ed., V. Covello, D. McCallum, and M. Pavolva, NY: Plenum, 143-160.