



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

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OFFICE OF POLICY,
ECONOMICS, AND INNOVATION

Don Arbuckle
Deputy Administrator
Office of Information and Regulatory Affairs
Office of Management and Budget, NEOB
725 17th Street, NW
Washington, DC 20503

Dear Mr. Arbuckle:

Thank you for the opportunity to comment on OMB's *Draft Report to Congress on the Costs and Benefits of Federal Regulations* (i.e., the draft report) dated March 28, 2002. Overall, we found the draft report to be informative and constructive.

We applaud the draft report's emphasis on the Administration's support for regulations based on sound science, economics, and law. We look forward to participating in a process for revising OMB's economic analysis guidelines that reflects this approach. We recognize the importance of the analytic issues you have identified for review, and have a great deal of experience and information to share on several of these issues as a result of our extensive process to develop our externally peer reviewed *Guidelines for Preparing Economic Analyses*. We would like to offer to participate actively in the OMB-CEA process.

We also hope to work with you as you investigate suggestions from the public for regulatory reform improvements. We would be happy to provide additional information to help clarify some of the issues raised in the comments.

I am attaching detailed comments on a number of issues raised in the draft report. We reviewed the summary of costs and benefits for EPA rules that appear in the report, and offer several comments specific to our rules. Additionally, we present comments on both policy and technical issues raised in the report, including peer review, the proposal for a scientific advisory panel to OIRA, and revisions made in the report to agency estimates.

Thanks again for the opportunity to comment. We look forward to working with you on finalizing the report as well as future endeavors to revise the economic analysis guidelines.

Sincerely,

Thomas J. Gibson
Associate Administrator

Attachments

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**EPA Draft Comments on OMB's
"Draft Report to Congress on the Costs and Benefits of Federal Regulations"
(March 28, 2002)**

note: Page numbers refer either to the FR Notice (pages 15014-15045) or the .pdf version of the report (pages 1-143))

Peer Review (page 15019; page 23-24)

Issue: OIRA recommends that "draft RIAs, including supporting technical documents (e.g., risk assessments), be subjected to formal, independent external peer review by qualified specialists...OIRA will give a measure of deference to agency analysis that has been developed in conjunction with such peer review procedures."

Discussion: EPA recognizes the importance of appropriate peer review, as reflected in the Agency's Peer Review Policy and recently revised Peer Review Handbook. EPA has been a leader in the Federal government in promoting better peer review of policy-relevant scientific and economic studies. Peer review is an essential element in EPA's commitment to the principles of good science, and is essential to improve credibility in policy-making. EPA has developed its own extensively peer-reviewed *Guidelines for Preparing Economic Analyses* and has utilized esteemed external organizations, such as the National Academy of Sciences, to provide peer review of a number of regulations, scientific studies, and policies.

EPA's Peer Review Policy does not require all RIAs to be subjected to formal, independent, external peer review. Rather, the peer review of economic analyses at EPA depends on the type of analysis at issue and the use to which it will be put. The Agency conducts independent external peer review of a number of economic work products, including (1) internal Agency guidance for conducting economic analysis; (2) new economic methodologies that will serve as a principal method for conducting economic analyses within programs; (3) unique or novel application of existing economic methodologies, particularly those that are recognized to be outside mainstream economic practices; and (4) broad-scale economic assessments of regulatory programs.

Economic analyses prepared in support of economically significant regulations typically do not utilize innovative or untried economic methods. As a result, EPA does not typically subject the straightforward application of accepted, previously peer reviewed economic methods or analyses supporting rulemakings to formal external peer review. Economic assessments prepared to support the regulatory development process routinely make use of previously published peer reviewed literature and adopt tools that allow for the transfer or adaptation of these techniques and information. The procedures used to transfer or adapt this work will generally be established by separate economic guidance documents that have been peer reviewed. The economic analyses for these rules are subject to internal review to ensure compliance with EPA and OMB guidelines for economic analysis.

EPA's policy of not conducting external peer reviews of every RIA is a rational use of limited resources. External review of every individual RIA—including those that merely reflect straightforward application of standard economic methodologies-- would impose substantial costs in terms of Agency resources and regulatory delays. For example, in the case of the arsenic rule, approximately \$1 million was spent on a rigorous review process above and beyond the original rulemaking costs. Although it is important to use quality information when developing regulations and guidance, the additional resources and time required have to be taken into consideration. Further, the increased demand on Agency resources of the peer review process would mean that the Agency could engage in fewer activities that protect human health and the environment. The final OMB report should explain the trade-offs involved in devoting resources to external peer review so the reader can better understand an agency's decision-making process on this issue and recognize the validity of an approach such as EPA's.

Refining OMB's Formal Economic Analysis Guidance (page 15021/pages 35-36)

Issue: OIRA has initiated a process to refine its formal regulatory impact analytic guidance documents. This activity, to be co-chaired by the OIRA Administrator and a member of the Council of Economic Advisors (CEA), will be supported by public comment, agency comments, and external peer review. In the draft report, OMB is seeking comment on issues that should be addressed in the refinement of OMB's analytic guidelines, and specifies particular issues to be included.

Discussion: The draft OMB report emphasizes that the Administration supports regulations that are based on sound science, economics, and law (page 15015). We look forward to participating in a process for revising the economic analysis guidelines that reflects this approach.

EPA supports OMB's commitment to rigorous peer review by independent external experts for any analytical guidance that OMB develops. Due to the potential impact of these analytic guidance documents across the government, EPA recommends that such documents undergo extensive scrutiny by the most highly qualified independent scientists and economists. Specifically, EPA recommends that OMB collaborate with affected agencies and an independent body such as the National Academy of Sciences to establish a peer review panel of esteemed external experts for all of OMB's guidance documents and internal procedures. It is important that OMB products and practices meet or exceed the highest independent external peer review standards that federal regulatory agencies are required to meet.

While the issues identified in the draft report are all good candidates for improvement, the economics literature addressing some of these is quite limited and not likely to provide sufficient information in support of specific guidance. However, we believe that consideration of these issues may help stimulate additional needed research, and therefore support these efforts. The discount rate issue has a reasonably strong body of literature that should be relied on to make appropriate adjustments to the guidance.

1) The practice of applying a 7% real discount rate to future costs and benefits:

We are pleased to see that OMB is planning to reevaluate its long-standing recommendation to use a 7% discount rate in the economic analysis. Scholarly articles in the economics literature have consistently estimated the social discount rate to be in the range of 1-3%. Recent literature addressing the openness of the economy to funds from the international community strengthens the argument for using the social discount rate rather than a blend of social and private rates. We have extensively researched and reviewed this issue (including robust external peer review) and would be happy to assist OMB/CEA on this issue. Please see Appendix A for more detailed comments on this issue.

2) Accounting for latency

Developing the proper way to address latency is an issue that will need additional research, especially in the area of risk assessment. It is rare for the risk assessment community to have research available to specify the period of latency for a disease. Consequently, efforts to incorporate latency into economic analysis will continue to be fraught with uncertainty until latency processes are well defined in the context of risk assessment. We would be happy to work with OMB and CEA on this issue and draw on our experiences across the Agency.

3) Methods to evaluate the risk of premature death, particularly the relative advantages and disadvantages of differing statistical approaches, including the quality-adjusted life years approach

Quality-adjusted life years (QALYs), while commonly used in the health economics field, is an area that needs additional research before being applied in the environmental field. There is currently a substantial ongoing debate in the academic and policy communities on the theoretical and social relevance of QALYs to environmental policy analysis. In particular, the conventional foundations of benefit-cost analysis suggest that values of risk reduction are better assessed via willingness-to-pay methods. Such methods give estimates that more closely reflect conceptual principles than estimates derived from QALYs. In addition, there are unresolved implementation issues regarding QALYs. For example, because environmental risk assessors currently do not extrapolate the timing of the risk, the age that an illness is likely to occur is unknown.

Moreover, new empirical results by well-qualified independent researchers refute the assumption that individuals attribute a lower value to a life-year if they have fewer remaining life-years or they have a compromised health status.

[The use of QALYs] assumes that the value of lives saved is strictly proportional to remaining life expectancy, and that the value of saving a life-year is less for a person with a chronic disease, such as chronic bronchitis, than for a healthy person, with the exact equivalence determined by QALY weights. Our results do not support either of these assumptions. There is no evidence that the VSL [value of a statistical life]

should be equally apportioned over remaining life expectancy, or that the VSL is systematically lower for persons with chronic illness. (Krupnick et al., 2002, p. 18)

Removed from benefit-cost analysis, QALYs offer some advantages over estimates of risk valuation based on willingness to pay. For example, QALYs (arguably) apply equal weights to risk reductions realized by different wealth/income groups, which has normative analytical appeal. However, the QALY method also creates systematic biases along other population dimensions (such as its apparent undervaluation of risk reductions conferred on the infirm, handicapped, and/or elderly).

We support a full and open discussion of this method, including a rigorous review of the theoretical, empirical, practical, and legal/ethical issues associated with expanding use of QALY methods beyond traditional medical treatment programs. Until well-defined and defensible methods are available, it would not seem appropriate to make the inclusion of QALYs a standard requirement for economic analyses.

Recent advice to EPA from its Science Advisory Board (SAB) supports this position. In reviewing EPA's proposed analysis of the Clean Air Act cost and benefits, the SAB advised EPA that it is not appropriate to use estimates of QALYs for EPA benefits analyses, because "alternative measures, such as the value of a statistical life-year (VSLY) or the value of a QALY, are not consistent with the standard theory of individual willingness-to-pay for mortality risk reduction." However, the SAB suggested that QALY approaches could be useful to EPA as a complement to our existing methods. They stated that this is especially the case when analyzing regulation-related impacts of preventing morbid disease incidence, noting that QALY-based measures "are best considered as an adjunct method for presenting information about people's ratings of non-fatal health outcomes." Specifically, the SAB suggested that EPA "consider calculating the cost-effectiveness of the Clean Air Act and certain of its provisions for comparison with other interventions that improve health. In other areas of public health, cost-effectiveness is frequently characterized as cost per QALY gained." (EPA-SAB-COUNCIL-ADV-01-004)

4) Methods of risk assessment that supply central estimates of risk as well as the upper and lower bounds on the true yet unknown risks

EPA agrees that both upper and lower bounds of risk estimates along with measures of central tendency ideally should be part of the deliberative process. However, there are certain situations, such as screening analyses, where it would be inappropriate to use, or the data are insufficient to calculate, the central estimates of risk. The OMB guidance should recognize that the approach taken to generating a range will necessarily depend on the nature of the underlying data and models. Flexibility is needed with regard to the appropriate tools used to develop a range of risk estimates, depending on the nature of the available data and scientific understanding of the risk

In addition, many of EPA's current risk assessment models produce only "point estimates" rather

than distributions of risk estimates from which a legitimate measure of central tendency could be extracted. EPA has considerable experience in this area which we would like to share with OMB and CEA.

5) Methods for valuing improvements in children's health

This is an important topic *that will* require further research before adequate guidance can be developed. Our recently completed "Children's Health Evaluation Handbook" (July 2001) examines risk assessment and valuation procedures for valuing improvements in children's health. We would like to bring our experiences to bear in helping OMB address this area.

Additional Analytic Issues for Consideration:

EPA proposes three additional analytic issues for consideration in new OMB guidelines:

- (1) We believe an in-depth review and development of practical analytical methods is necessary to redress the biases that result from persistent imbalances in the completeness and accuracy of estimates for benefits and costs. This is particularly important since OMB's new data quality guidelines may result in additional elimination of benefit endpoints and the subsequent risk of further biases in program comparisons using OMB's proposed "league tables."
- (2) Both EPA and OMB understand the importance of data quality and sound science in our analyses. We believe that it is important for analytical quality to be consistent throughout the administrative process, and that a process should be established to address this issue.
- (3) EPA supports the consolidation of the UMRA and Thompson Reports. In the past, the agencies provided OMB similar information on agency rulemakings in different formats for the two reports. If OMB does not continue to consolidate the two reports, then OMB should provide more detailed guidance on preparing the summary of economic impacts in a specific format to facilitate the compilations that are now required for these two reports.

Scientific Advisory Panel to OIRA (page 15022)

Issue: The draft report states that OMB is in the process of forming a scientific advisory panel that will serve OIRA by suggesting initiatives, evaluating ongoing activities, commenting on national and international policy developments, and acting as a resource and recruitment mechanism.

Discussion: The description of the purpose and function of the new OMB scientific advisory panel raises several questions. In the final report, OMB should provide additional information about the function and responsibilities of this new panel, particularly with regard to its role in evaluating national and international policies. For example, how will the activities of this panel interact with those of other existing scientific advisory panels at individual agencies or the

panel's composition and identifying the issues it will address.

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ton estimate used in this report.” However, the draft report does not mention that the NSR benefits transfer values were intended only for application to utility reductions in NO_x and SO₂. The more relevant values from the Tier 2 and Heavy Duty Engine rulemakings are not mentioned.

In addition, we are concerned that the draft report applies available estimates of \$/ton for NO_x derived from analyses of utility NO_x reductions. There are a number of reasons to expect that reductions in NO_x emissions from utility sources achieve different air quality improvements relative to reduction\$ ~~from~~ ground-level mobile sources.

For the “Control of emissions of air pollution ~~from~~2004 and later model year highway heavy-duty engines and revision of light-duty truck definition” rule, the final report should apply a benefit per NO_x ton reduced based on the Heavy Duty Engine/Diesel Fuel rule benefits analysis. Based on the air quality modeling conducted for that rulemaking, the reductions in NO_x emissions from heavy duty engine vehicles result in approximately \$10,200 per ton of NO_x (scaled to 2001 populations, in constant 1999 dollars, accounting for growth in real income from 1990 to 2001). Application of this transfer value to the estimated 2.5 million tons of NO_x reduced by this rule leads to an estimate of \$25.5 billion in monetized health benefits. We would be happy to work with OMB to develop appropriate characterizations of the benefits of the EPA rules evaluated using the “\$ per ton” method.

See Appendix B for further detailed comments on \$/ton estimates.

Inconsistencies with OMB’s Information Quality Guidelines

Issue: Beginning on Page 15019 (page 22), the draft report outlines six elements set forth in a September 20, 2001: memorandum from the OIRA Administrator to the President’s Management Council (PMC). According to the text, these six elements must accompany any draft significant regulatory action submitted to OMB. Element three recommends that agencies “adopt” the Safe Drinking Water Act (SDWA) Principles for all draft regulatory actions “that *are supported by risk* assessments of health, safety, and environmental hazards”. OMB then mentions that “these standards were recently codified in OMB’s government-wide guidelines on information quality.”

Discussion: We suggest the following technical revisions to these statements:

- 1) The OMB information quality guidelines (67 FR 8460) tell agencies to adopt or adapt the SDWA quality principles. OMB chose this approach in recognition that the principles, as written, apply to “public health effects.” EPA and other agencies conduct risk assessments for environmental and safety risks and need the ability to adapt the SDWA principles to those types of assessment. The final report should be consistent with the OMB information quality guidelines in this regard.
- 2) The SDWA principles were not *codified* in the guidelines issued by OMB, since the information quality guidelines are not a rule.

- 3) Additional language should be included to inform the reader that the **SDWA** quality principles were proposed by OMB for adoption or adaptation by federal agencies in their information quality guidelines for influential information (not draft regulatory actions).
- 4) On Page 33 (page 15021), second paragraph, the first sentence is confusing and should be clarified. It states: "The OMB guidelines provide affected parties concerned about poor quality information with the opportunity to seek administrative corrections to agency information." OMB's guidelines direct federal agencies to develop their own administrative mechanisms to provide affected parties **with** the opportunity to seek **administrative** corrections to agency information.

Issue: With several important exceptions and qualifications, the OMB guidelines require that influential information disseminated by agencies be reproducible by qualified third parties. If influential information is to be disseminated without the capability of reproduction, it is subject to some additional robustness and transparency requirements. The OMB guidelines provide agencies a measure of flexibility in the interpretation and implementation of these expectations. Several elements of environment-related costs and benefits presented in the draft report do not appear to meet OMB's new data quality guidelines criteria for reproducibility, transparency, and quality. It is important for the final report to provide information of the highest quality as required of agencies under OMB's information quality guidelines.

Discussion: For example, the reader cannot verify the benefit-cost calculations in the draft report. The draft report explains general procedures. However, readers must read last year's report as well as other reports from the regulatory agencies and Federal Register notices if they are to verify that the draft report's numbers are generated as suggested.

We recognize that providing all the details on the origin of the numbers can make a document very lengthy and difficult to read. However, providing a few examples and greater details on where to find the underlying data would allow the reader to verify the calculations. Such clarification would be particularly appropriate and useful where OMB's calculations go beyond agency analyses, such as for the "\$ per ton" computations discussed above.

For example, EPA provided detailed reference information for its rules, including Federal Register volume and page numbers, relevant web sites, and documentation of reporting years for dollar estimates. However, those detailed references are missing from the draft report. Additionally, in some instances, more than references to page numbers and web sites are required. For example, for the regional haze rule, the analysis included four illustrative progress goals and two sets of control strategies. It is unclear which of these were chosen and embedded in the estimates in the draft report.

In cases where agencies have not adopted estimates of the value of reducing premature mortality risks, the draft report uses estimates supported by the relevant academic literature. The draft report does not document these values or their underlying basis. These values, if used, should be

disclosed and documented in the final report.

Rules

TRI Lead Rule (p. 64, page 15027): The benefits column of the entry for “Lead and Lead Compounds: Lowering of Reporting Thresholds; Community Right-to-Know Toxic Chemical Release Reporting” states that benefits were “Not estimated.” We believe that it would be more accurate to state that benefits were “Not monetized.” The regulation is expected to result in additional reporting on lead and lead compounds from approximately 9,800 industrial facilities. This action will substantially expand the publicly available database of information on facilities that manufacture, process, or otherwise use these persistent, bioaccumulative, toxic chemicals. The expected increase in reporting is a quantified measure of benefit that should be reflected in the final report.

Tier 2 and Heavy Duty Diesel Rule: (p. 135): The method the draft report uses to annualize benefits for the Tier 2 and Heavy Duty Diesel Rule is not accurate. EPA deliberately did not do early year benefits because the program has a long phase-in period before it is fully implemented. The method in the draft report inappropriately front loads the costs to a time prior to the program’s full implementation. Because of these assumptions, the benefit-cost ratio goes from about 16:1 to less than 5:1. The final report should clearly state why EPA estimated benefits for 2030.

Miscellaneous:

Qualitative vs. Quantitative vs. Monetized Benefit Estimates: It would be helpful if the final report expands on the concept of qualitative vs. quantitative vs. monetized treatment of benefits. Estimation of monetized benefits is often difficult and dependent on a still-evolving economic science. The final report should explain the resource implications associated with producing monetized benefit estimates (willingness-to-pay to avoid morbidity and mortality, etc.). In our opinion, when government agencies are unable to monetize benefits estimates — especially for morbidity — it is due to deficiencies in the underlying discipline of economics, as opposed to a deficiency in the regulatory process. It would be helpful if the final report expanded on the idea that there is a spectrum of qualitative and quantitative information that can inform decision-making.

Table 7. “Summary of Agency Estimates for Final Rules” (p. 15025): This table Lists non-quantified cost/benefit information under “Other Information.” This makes the reporting of costs and benefits confusing, since the entries in those categories are incomplete. All cost information (quantified and unquantified) and all benefit information (quantified and unquantified) should be listed together.

Terms Economic Analysis (EA) and Regulatory Impact Analysis (RIA): Does the report intend to use the terms “economic analysis or EA” and “regulatory impact analysis or RIA”

interchangeably? Both terms appear to be used to refer to the same analysis, but it is not clear if there is an intended distinction. To reduce confusion, particularly for the public, it would be helpful if the final report clarifies this point.

Role of Legislation in Agency Rulemaking (p. 15022): In discussing and considering public nominations of rules to review or rescind, it is important for the final report to discuss the role that legislation plays in agency rulemaking. For example, when a statute specifically mandates a particular rulemaking activity, the implementing agency must issue a rule that is consistent with that mandate. Many of the public comments received on last year's report illustrate that this concept is not fully understood.

Clarification of "New Reform Ideas:" In discussing public nominations for review or rescission that were included in the OMB report last year (p. 15022, third column), OMB states that those that involved "new reform ideas (e.g., regarding rules under Toxic Substances Control Act (TSCA) [...] were modest in nature." However, the draft report does not provide any further information about which "new reform ideas" were being referenced. It would be helpful if the final report provided additional information to illustrate the "modest nature" of the ideas, and worked with the Agency to provide a statement in the final report about the implementation or status of those ideas.

ti with Agencies on Public Comments on Reform Recommendations: EP would welcome the opportunity to discuss suggested reform recommendations with OMB.

"Renew of Problematic Agency Guidance" (p. 15034): OMB requests comment (especially from the small business community) on the "nature and extent of problematic guidance documents (those that appear to have binding requirements) in agency policymaking, the adverse impacts, the benefits of proper guidance documents, and suggestions on how problematic guidance can be curtailed without undermining the typically appropriate use of guidance by Federal agencies." Commentors are asked to recommend remedies to the problem. We are concerned that this section of the draft report undermines important and useful agency guidance by suggesting that most agency guidance is problematic. For a number of years EPA has been sensitive to the criticism that some Agency guidance was treated as if it were binding. Since the enactment of the Congressional Review Act, EPA has instituted special review procedures to ensure that guidance documents do not contain binding legal requirements. We believe these procedures prevent EPA guidance from acting as a back door for rules. We also believe that the guidance we issue is helpful to EPA's regulated community, and in many cases the regulated community asks EPA for specific guidance. As we develop guidance documents, EPA manges for peer review of guidance documents that are considered major scientific or technical work products. For more significant guidance documents, even though it is not legally required, EPA generally solicits input from stakeholders on the draft guidance and considers that input before issuing final guidance. We believe it would be useful for OMB to solicit comment on good practices that agencies should use in issuing guidance and on the appropriate application of agency guidance.

EPA is working **hard** to ensure that we make clear for all concerned the non-binding nature of Agency guidance documents. **Our** ability to issue and amend guidance without onerous procedural requirements provides a valuable tool to help implement a regulation or program, and allows us to issue guidance quickly when needed. It is important to consider that there have only been a handful of "problematic" guidance documents. Rather than eliminating this valuable tool or hindering its use, OMB should consider other options for addressing these few problems.

Appendix C. "Estimate of Aggregate Costs and Benefits of Regulation" (p. 15037)

Clarify Aggregate Estimates: Although there is mention of which particular rules play a part in the calculation of the aggregate costs and benefits of government regulations, we believe that a clearer discussion would be helpful. It is not immediately obvious if the aggregate cost calculation includes rules for which benefits were not monetized. It appears that the aggregate calculations only **include** rules for which both monetized costs and benefits are available, but this should be clarified. In addition, the **summary** of costs and benefits in this appendix should be clarified, at least with a statement about the reliability and validity of the summary data (especially Table 13, "Total Annual Cost and Benefits of Regulations as of September 30, 2001").

Representation of EPA's Section 812 Results: EPA's Section 812 Reports contain the most rigorous, **comprehensive**, and extensively peer-reviewed aggregate estimates of Clean Air Act program costs and benefits available. As such, EPA believes it is important that a full discussion on the section 812 study results be included. Since the statute requiring the OMB report specifically calls for **presentation** of total estimated benefits and costs "in the aggregate" and "by agency and agency program," the final report should report the complete results of EPA's aggregate estimate of the benefits and costs of clean air programs.

Lack of Objective Source for Estimates in Table 11: The low end benefit estimate for environmental programs presented in Table 11 is based in **part** on an inaccurate, incomplete, and outdated study by Hahn and Hird (1991). Use of this **study**, with its 1991 publication date, is also confusing, because readers reasonably assume the *estimate* reflects benefits of *programs* implemented through the 1980s. The draft report reinforces this potential mis-impression by reporting results in Table 11 in year 2001 dollars. In reality, Hahn and Hird (1991) omits benefits of major CAA programs implemented through the mid-70s and 80s, including the phase down of lead in gasoline. Hahn and Hird (1991) does not generate benefit estimates, but instead cites estimates presented in a 1990 Paul Portney article, which in turn incorporates data drawn from a 1982 book by Rick Freeman estimating the benefits of 1960s and early-1970s air programs. The Hahn and Hird data should not be used in the final report because they are inconsistent with OMB's new information quality guidelines. If a range of air program-related benefit estimates is required for the final report, there are supplemental and alternative results available in EPA's section 812 reports that can be applied instead of the Hahn and Hird 1991 estimates.

Page 6. In the **draft** report benefits are described as “highly uncertain,” while no qualifier is provided to describe costs. In the final report, either the costs should be similarly depicted, or the **certainty** of the **costs** estimates should be documented.

Page 8. The **final** report should clarify the nature of the total cost to discretionary spending comparisons. For example, what were the technological change and rule effectiveness assumptions **inherent** in the cost calculations? What were the corresponding benefit estimates associated **with those** costs?

Page 33. It would be helpful to include a more specific web address for the OMB information quality guidelines.

Page 46. Second paragraph, last sentence: “Impose **an** (not and) unfunded mandate.....”

Page 52: The high end of the range for total benefits in Table 6 should be 94,195 rather **than** 67,602.

Page 64. The acronyms used in Table 7 should be defined.

Page **66.** For the NESHAP, the dollar year should be 1997, not 1999.

Page 83. OMB’s discussion of EC Activities should reference Environmental Issue Report No. 22 (2001) “Late Lessons From Early Warnings: The Precautionary Principle 1896-2000.” This report is an excellent example of why waiting for precise science can endanger **many** lives unnecessarily, and would provide more balance to the discussion.

Page 104. Appendix B, proposals to reform regulations. It would be informative to include information on any associated changes in net benefits resulting from the regulatory reform suggestions.

Page 110. Appendix C, Section B. Clarify that the reference is to U.S. GDP. Also, clarify the Hopkins reference. Is it for the 1995 or the 2001 report? In addition, are the estimates in Table 11 annualized or annual costs and benefits?

Page 111. In Section B, “Economic Regulation,” the draft report notes that “Economic theory predicts that [economic] regulation that restricts competitive prices and establishes entry barriers produces no social benefits....” This should read no *net* benefits, since such regulation can produce benefits for certain parties, and disbenefits for others.

Page 111. Section C, “Process Regulation,” discusses paperwork costs. **since these are** usually administrative costs of either social or economic regulation, it is unclear why these costs are

isolated into a separate category. In any case, it should be pointed out that these costs may double count costs that are already accounted for in the other categories.

Page 115. Table 13. Are these annual or annualized costs and benefits of regulations as of 9-30-01?

Pages 116-117. Reference the source of the municipal waste combustor and municipal landfill data. Also, note that these data are in 1990, not 2001, dollars.

Page 126. Appendix D. It would be helpful to provide a website address for the previous edition of this report.

Page 140. Please clarify what discount rate is used to calculate costs in Appendix D.

Appendix A: Further Comments on Discount Rate Issue

Some of our recent work has revealed the following:

- The Congressional Budget Office (CBO) generally requires the use of a social rate of time preference for social welfare analysis. They have set this rate at 2 percent, and suggest a sensitivity analysis using zero and 4 percent.
- The General Accounting Office (GAO) recommends the use of a very low discount rate when analyzing policies with large inter-generational effects involving human life. Their guidelines note that if the rule increases human productivity, the effective discount rate for evaluating the present value of future benefits and costs is roughly zero.
- The Final FEA Guidance on EAs, which received extensive public and peer review, including by the Science Advisory Board (SAB), recommends the use of a 2 to 3 percent social discount rate (in addition to the OMB rate of 7 percent in the sensitivity analysis to meet OMB requirements)
- The use of a 7 percent rate is **contrary** to the recommendations of the 1996 AEI-Annapolis Institute-RFF *Statement of Principles* (Arrow et al. 1996), which states: "the rate at which future benefits and costs should be discounted to present values will generally not equal the rate of return on private investment. The discount rate should instead be based on how individuals trade off current for future consumption." The preponderance of evidence sets this rate at 1-3 percent for individual tradeoffs on monetary outcomes.
- Weitzman (2001) surveyed over 2000 economists, whose suggested rates had a mean of about 4 percent, median of 3 percent, and mode of 2 percent. (A subset of 50 leading economists had a very similar distribution of responses.) He suggests using a rate of four percent for the immediate future (1 to 5 years) and lower rates for evaluating longer-term projects (the rate declines as the time path of the project increases: 3 percent for 6 to 25 years and 2 percent for 26 to 75 years). (However, we note that using different discount rates for different time horizons leads to time inconsistent decision-making.)
- The Public Health Service's Expert Panel on Cost Effectiveness Analysis in Medicine supports EPA's position that 3 percent is the most appropriate rate to use for analyses of health and medicine. The work, which OMB cites on p. 36 of its draft report: "Cost Effectiveness in Health and Medicine" by Gold, Siegel, Russell, and Weinstein, supports the use of a 3 percent rate.
- There is increasing evidence that the social rate of time preference is the appropriate rate to rely on for discounting. Recent economic analyses show that regulations do not displace capital to the degree once thought, due to today's open economies. Increased

demand for investments in **the** United States attract funds from other **parts** of the world. This **relatively** elastic supply of capital reduces the difference between the rate of return on investments **and** the **social** rate of time preference (Lind 1990).

- Guyse, et al.'s empirical research (2001) suggests that people may have lower, even **negative** in **some** circumstances, discount rates for health **and** environmental future **outcomes** **than** for monetary outcomes.
- Luckert and Adamowicz (1993) show that discount rates can vary for different goods, with **public** **and** **environmental** goods having lower discount rates.

Appendix B: Comment on \$/ton estimates:

EPA has concerns with the use of the benefits per ton estimates for NO_x and other pollutants from the 1997 Pulp and Paper cluster rule (derived from the 1997 RIA for the revised ozone and PM NAAQS). We are especially concerned with the assumption that VOC/hydrocarbon and NO_x emissions have the same value per ton. This application is based on the assumption that the VOC related benefits in the Pulp and Paper RIA are applicable to NO_x tons reduced. This assumption is incorrect for a number of reasons. First, the Pulp and Paper RIA provided only per ton values for ozone benefits related to VOC reductions and did not include any PM related benefits. However, NO_x contributes significantly to the formation of particulate nitrate, a component of PM_{2.5}. Therefore, using a \$/ton value based only on ozone benefits related to VOC reductions to estimate the economic value of NO_x reductions affecting both ambient ozone and ambient PM results in a substantial underestimate of the economic benefits of NO_x control programs. Second, even as a per-ton value for VOCs, the estimate derived from the Pulp and Paper RIA is obsolete, since it was based on economic and scientific best practices prevailing in 1997. Since 1997, best practices for estimating both ozone-related benefits (relevant for valuing NO_x and VOC reductions) and PM-related benefits (relevant for valuing NO_x, SO₂, and other ambient PM precursors) have changed significantly. Some important changes since that time (based on a thorough review by EPA's Science Advisory Board of most of the studies and methods used by EPA in its analyses of the benefits of air pollution reductions) include:

- Removal of ozone-related premature mortality as a separate endpoint in the analysis of NO_x-related benefits
- Removal of the value of improvements in residential visibility, reductions in household soiling, and reductions in nitrogen deposition to estuaries from the primary estimate of benefits.
- Addition of an assumed five year distributed lag in the reduction in incidences of PM-related premature mortality.
- Removal of a threshold in PM health functions.

In addition, there are significant uncertainties and potential biases inherent in any benefits analysis based on \$/ton benefits transfer techniques. The degree of uncertainty and bias depends on how divergent the reality of the policy situation is from the state of the world assumed in the benefits transfer. Uncertainty and variability in the benefits transfer values may be due to several factors that should be considered when applying these values for policy analysis. These factors include sources of emissions, meteorology, transport of emissions, initial pollutant concentrations, population density, and population demographics, such as proportion of elderly and children and baseline incidence rates for health effects.

In order to minimize biases and uncertainties arising from benefits transfer, EPA believes that

benefit transfer values for individual pollutants should be based on primary benefits analyses for rules where the pollutant of interest, e.g. NO_x, is the primary pollutant controlled by the rule. The ozone and PM NAAQS benefits estimates used as the source for the Pulp and Paper RIA \$/ton values were based on reductions in a number of pollutants, including NO_x, SO₂, VOC, primary particulates, and secondary organic aerosols, and in fact NO_x emissions accounted for only 49 percent of ozone precursor emissions and 12 percent of PM_{2.5} precursor emissions. In cases where NO_x accounts for only a relatively minor fraction of precursor emissions, the assumptions that must be made regarding the allocation of total ambient pollutant reduction benefits among several precursor pollutants impose huge additional uncertainties and potential biases in the estimate of the implicit value for any particular precursor pollutant. These additional uncertainties and biases can be avoided by relying instead on NO_x-only benefits analysis when available.

Also, benefit transfer values should, where possible, be derived from analyses of the benefits of reductions in pollutants from similar sources. Since the primary use for the NO_x \$/ton values in the draft report is in application to emissions reductions from mobile sources (Handheld Engines and 2004 Heavy Duty Vehicles), an appropriate source analysis would focus on reductions in mobile source NO_x emissions. Mobile source NO_x reductions are more spatially dispersed than reductions in concentrated plumes from utility and major industrial sources (such as those reflected in the NO_x SIP call and Section 126 RIA analyses). This results in two important differences: (a) since the NO_x in high-concentration plumes is less efficient at ozone-production on a per-ton basis than more dispersed NO_x, the ozone-related benefits of a generic reduction from concentrated stationary sources would likely be smaller than reductions from dispersed sources such as motor vehicles; and (b) to the extent the high-concentration plumes are contributing to baseline conditions reflecting NO_x scavenging, then reductions in NO_x from high-concentration plumes presumably would yield smaller benefits than dispersed source reductions (because the NO_x reduction eliminates a scavenging "benefit" manifest in the baseline). Taken together, these two factors imply that using a NO_x benefits analysis based on reductions in geographically isolated, relatively high concentration stationary source NO_x plumes as the basis for valuing reductions in broadly dispersed, lower concentration NO_x from mobile sources would bias the resulting \$/ton-based benefits estimate downward by a potentially significant amount.

A more appropriate transfer value for NO_x reductions would incorporate the SAB's recommendations for benefits analysis and be derived from a rule in which NO_x from mobile sources was the primary pollutant controlled. EPA has recently published the final Tier 2/Gasoline Sulfur rule RIA (EPA, 1999) and Heavy Duty Engine/Diesel Fuel RIA (EPA, 2000). For the Tier 2 rule, which affects light-duty vehicles, NO_x reductions account for around 90 percent of PM precursor emissions and 86 percent of ozone precursor emissions. As such, it is a much more appropriate source for the NO_x benefit transfer value. Since the publication of the final Tier 2/Gasoline Sulfur RIA, EPA has conducted additional benefits modeling using the Tier 2 emissions data as part of ongoing efforts in improving benefits methods. As part of this modeling effort, EPA has generated an additional PM-related benefit estimate based solely on the

NOx reductions expected from the Tier 2 regulation, Holding the SO₂ emissions levels constant allows us to isolate the PM-related benefits associated with NOx emissions reductions, avoiding the need for assumptions about proportionality between emissions reductions and benefits. This NOx-only PM benefits analysis can be used to generate a \$/ton for PM-related NOx benefits. The \$/ton for ozone-related NOx benefits is generated using the ozone-related benefits estimate from the Tier 2/Gasoline Sulfur RIA and maintaining the assumption of proportionality between ozone precursor emissions reductions and ozone-related benefits. The total value per ton of NOx (including both ozone and PM related benefits) is \$4,900/ton (1996\$) using EPA's preferred estimate of the value of a statistical life (\$5.9 million 1997\$ per life), and \$3,400/ton using an alternative age-adjusted VSLY approach (\$3.6 million 1997\$ per life). If the report continues to use the "\$ per ton" method, EPA prefers this set of values over the NOx benefit/ton values derived from the Pulp and Paper RIA. Additional details on the Tier 2 benefits analysis is available in the Tier 2/Sulfur Final Rulemaking RIA, available on the web at <http://www.epa.gov/oms/fuels.htm>.

The Heavy Duty Engine/Diesel Fuel benefits analysis examined the impacts in 2030 of reducing SO₂ emissions by 141,000 tons and NO_x emissions by 2,570 thousand tons, as well as a 109 thousand ton reduction in direct PM emissions. We employed the REMSAD modeling used for the HD Engine/Diesel Fuel Rule RIA benefits analysis to determine estimates of damages/ton. We examined the impacts of SO₂, NO_x, and direct PM emissions. We developed \$/ton estimates based solely on the PM related health benefits. While the vast majority of the benefits we are able to measure are PM health related, one important limitation is that benefits from ozone reductions, visibility improvement, and other unquantifiable health endpoints are not captured in these estimates. Based on this analysis (scaled to 2001 populations and accounting for growth in real income from 1990 to 2001), NO_x tons should be valued at \$10,200/ton, SO₂ tons should be valued at \$16,600/ton, and direct PM_{2.5} tons should be valued at \$142,900/ton (all values in \$1999). Aggregate damage estimates at the national level can be scaled by population to account for population changes between years of analysis. Complete details of the emissions, air quality, and benefits modeling conducted for the HD Engine/Diesel Fuel Rule can be found at <http://www.eua.gov/otaq/diesel.htm> and <http://www.epa.gov/ttn/ecas/regdata/tsdhddv8.pdf>.