U.S. Environmental Protection Agency
Science Advisory Board
Economic Guidelines Review Panel

Summary Minutes for the Public Meeting
held on
May 18, 2020
May 21, 2020
May 26, 2020

Meeting Participants:

Economic Guidelines Review Panel Members

Dr. John D. Graham, Chair	Dr. Caroline Cecot	Dr. Craig Landry
Dr. Joseph E. Aldy	Dr. Karen Clay	Dr. Arik Levinson
Dr. Dan Black	Dr. R. Scott Farrow	Dr. Joshua Linn
Dr. Spencer Banzhaf	Dr. Art Fraas	Dr. Richard A. Williams

See the roster[i] for full membership.

Designated Federal Officer
Dr. Shaunta Hill-Hammond, EPA Science Advisory Board Staff Office.

Other Attendees
See Attachment A.

Meeting Summary:

The Science Advisory Board (SAB) Economic Guidelines Review Panel (referred to as EGRP or Panel) convened a public meeting on May 18, May 21 and May 26, 2020. The purpose of the meeting was to conduct a peer review of the EPA's revised document titled "*Guidelines for Preparing Economic Analyses*"[ii] (referred to as Guidelines) and develop responses to charge questions. Discussions for each meeting date are described below.

May 18, 2020

Meeting convened
The SAB Economic Guidelines Review Panel convened for a public meeting at approximately 11:00 a.m. Eastern Time (EST). Dr. Shaunta Hill-Hammond (Hill), Designated Federal Officer (DFO) for the EGRP opened the meeting. She gave an opening statement informing participants that the EGRP operates under the Federal Advisory Committee Act (FACA) and federal ethics laws. Dr. Hill explained this was the first of three meeting dates during which the Panel would discuss its responses to the EPA's charge questions related to the agency's revised Guidelines. Dr. Hill noted that two registered speakers[iii] would provide oral comments during the meeting. She then invited Dr. John Graham, chair for the EGRP to offer remarks.

Dr. Graham proceeded with his welcoming remarks, reviewed the meeting agenda and conducted a roll call of the Panel. He thanked Dr. Hill for compiling the comments and thanked the

members of the Panel for their efforts in reviewing the revised Guidelines. He also thanked members of the public for the submission of their written comments. Dr. Graham noted that all comments from panelists would be considered and reminded the Panel that they would need to consider the prioritization of all recommendations, categorizing them by Tier 1: Key revisions, Tier 2: Suggestions and Tier 3: Future considerations.

Following Dr. Graham's comments, Dr. Hill initited the public comment period. As the registered speakers were not available, Dr. Hill suggested that the Panel proceed with its discussion of Chapter 1 before starting the public comment period. Dr. Graham agreed and introduced the subgroup for Chapter 1 as Drs. Richard Williams and Caroline Cecot.

Panel Discussion

Chapter 1:

Dr. Williams commended the EPA for its work on the revised Guidelines. He shared that the overall content of the document was complete but also dense. He noted that summaries and text boxes within the revised Guidelines would be helpful to highlight key points. Dr. Williams commented that decisions are made for a variety of reasons that go beyond costs and benefits and as such, he thought economists should simply weigh in on the costs and benefits but not identify the best decision. Dr. Williams thought that the revised Guidelines should include an option to evaluate methods not currently authorized by statute, based on the target audience. He also noted that economics in general should not be called upon to advance decisions or make decisions. He shared that advice to decision makers and guidance to economists should be separated and clear within the revised Guidelines. Dr, Williams found section 1.4 to be important as it helps economists decide what is useful and what is not in terms of inputs to a Regulatory Impact Analysis (RIA).

Dr. Cecot thought the revised Guidelines should require that the proposed option be identified and included against a backdrop of more or less stringent options. References to "preferred action" are unnecessary and problematic because they suggest a normative decision on the best approach. Dr. Cecot also questioned the target audience of the revised Guidelines. She understood the primary audience to be the analyst and if that were true, then the revised Guidelines should focus on information that is helpful to the analyst. Based on that, the Panel can decide whether additional information is needed, what information is most helpful or if information can be withdrawn from the revised Guidelines. On the first section on economic efficiency, Dr. Cecot did not think Executive Order 12866 required that the EPA explain why a particular action was preferable in the RIA. The reason for choosing one option over an alternative could be somewhere else.

Dr. Graham requested input from the rest of the Panel. Dr. Fraas, commented on page 1-5, line 37 of the revised Guidelines noting that the EPA might want to tone down use of the word "adhere", suggesting, "faithfully present" as an alternative term. Dr. Frass said he would like to see all justifications for the choice of the option relegated to the preamble rather than in the RIA. Dr. Fraas suggested "selected" or "proposed" as an alternative to "preferred" option.

Dr. Levinson noted inconsistencies in the document in the way it described costs and benefits and suggested that net benefits (B-C) were a better than a benefit/cost ratio (B/C) because the distinction between benefits and negative costs doesn't matter for the former but matters for the latter.

Dr. Farrow offered comments on Text Box 1.1 and shared that he found it difficult to determine from an analyst perspective what the guidance would be. He thought that the revised Guidelines should include a tiered crosswalk to outline key text for given topic areas.

Dr. Levinson noted that Text Box 1.1 was adopted from Office of Management and Budget (OMB) and that it might be worth noting any departures from the OMB version of the list (should any exist). Panelists then discussed what items from the checklist (Text Box 1.1) were particular to the EPA.

Based on the discussion, Dr. Graham shared that the Panel should highlight within its report that the target audience of the revised Guidelines should be staff preparing economic analyses.. Following the discussion on Chapter 1, Dr. Hill initiated the public comment period.

Public comments

Mr. Max Sarinsky (Institute for Policy Integrity) noted that that written comments for Chapters 1-7 were submitted and written comments for Chapters 8-11 were pending submission. Mr. Sarinsky shared that his comments were for specific edits to the revised Guidelines. (1) The revised Guidelines recognize the consumption discount rate is more appropriate than opportunity cost of capital. The revised Guidelines fail to recognize the consumption discount rate is lower and probably closer to 2%. We need declining discount rate for long time horizons. The revised Guidelines should recommend declining rate for long time horizons. (2) Regarding indirect impacts in Chapters 3 and 5, the revised Guidelines appropriately counsel that analyses count all welfare effects. The Panel should refine its suggestions that the EPA consider alternative ways of obtaining benefits that do not meet the statutory objective. The revised Guidelines should recognize that multiple regs may carry additional cost and lose efficiency compared to a unified pollutant approach. Separate rulemakings might not be realistically achievable. (3) The revised Guidelines should recommend that the EPA evaluate important international impacts like Green House Gas emissions. Not counting those climate effects outside U.S. borders will fail to maximize U.S. welfare and is inconsistent with the treatment of costs that counts impacts to foreign shareholders on companies with domestic facilities.

No questions were presented by the Panel for Mr. Sarinsky.

Ms. Tayyaba Zeb, (U.S. Small Business Administration) asked that the Panel consider the Regulatory Flexibility Act and encouraged the Panel to consider ways in which the EPA might better consider the impacts of its regulations on small businesses. Ms. Zeb encouraged the Panel to think about recommendations that would strengthen the EPA's consideration of disproportionate impacts on small businesses.

No questions were presented by the Panel for Ms. Zeb. Following the public comment period, the Panel continued its discussion the revised Guidelines. Dr. Graham introduced the subgroup for Chapter 2 as Drs. Richard Williams and Caroline Cecot.

Chapter 2:
Dr. Williams said it may be helpful to present similar or related requirements into one section that cites the various statutes, order and memos requiring them. He noted that the revised Guidelines should state that OMB makes the determination of when a full RIA has to be done. Although we have all these categories about what is "significant," at the end of the day, it is OMB who makes the decision about what is "significant."

Dr. Cecot pondered whether the revised Guidelines should provide guidance on retrospective reviews. She also considers whether including a list of program specific requirements that may triggered would be helpful.

Dr. Graham requested input from the rest of the Panel. Dr. Fraas noted with reference to guidance on retrospective analysis, that the revised Guidelines does include via footnote a brief reference to Executive Order 13563[1]. His sense of the revised Guidelines was that it covered more than costs and benefit analysis and so raising the question on whether retrospective analysis deserves a chapter within the revised Guidelines is warranted. He wondered if the evidence-based act should also be referenced within the revised Guidelines.

Dr. Graham offered a comment, noting that the Chapter 2 would be a good place to suggest that the RIA may outline what type of information would be needed down the road to evaluate regulations. As such the EPA could add a paragraph or two retrospective analysis. Dr. Graham then proceeded with discussion for Chapter 3. Drs. Richard Williams and Caroline Cecot were noted as the assigned subgroup.

Chapter 3:
Dr. Williams said there needs to a section on government failures e.g. unintended consequences and instructions to economists to specifically state when there is not a market failure. If a regulation is chosen for reasons other than market failure, it's important to state it. Market failures generally were systemic problems. The revised Guidelines should note that evidence of market failure should presented. Dr. Williams said Text Box 3.1 could use some updating, e.g. with research on the power of the internet to facilitate bargaining solutions. He also suggested that the chapter include options not currently allowed by law and that the preferred option be identified.

Dr. Cecot echoed Dr. Banzhaf's written comments calling for a better definition of "externalities." Instead of using "unintended," Dr. Cecot suggested "uncompensated effects" or "unpriced effects." Dr. Cecot also thought the RIA should identify the "selected option" or "chosen option" when the decision has already been made and it should consider potential policy options not currently allowed by law.

Dr. Graham requested input from the rest of the Panel. Dr. Farrow noted that the revised Guidelines should be consistent in its reference to co-benefits or ancillary benefits throughout. Dr. Fraas said too many RIAs lump together a variety of regulatory requirements rather than provide a cost-benefit estimate for individual regulatory requirements. While this is recognized

[1] Executive Order 13563, issued in January 2011, supplements and reaffirms the provisions of EO 12866.

in the revised Guidelines on page 3-5, he thought this point should be highlighted in a text box. Dr. Banzhaf reminded panelists that the optimal point where marginal cost equals marginal benefits was not necessarily a point of zero pollution and zero health effects.

Dr. Cecot offered some alternative definitions of externalities. Dr. Williams said there should be some guidance on how to respond to public comments on RIAs and that the EPA should provide more reasoning behind its responses to comments. Dr. Linn said he wasn't clear on the consideration of alternatives, including those not allowed under the statute, and called for more specifics on what the Panel might be recommending. Dr. Cecot agreed it might be worthwhile to emphasize a bit more what these alternatives are. She agreed that statutory constraints should not be binding on the choice of reasonable alternative. Dr. Graham suggested the discussion should be nuanced on this point. Dr. Graham reminded panelists that the "scope" or "coverage" of the rule could be just as consequential as the choice of policy alternative itself.

The Panel held a break for 10 minutes, returning at 12:35 pm EST. Dr. Graham conducted a roll call and then proceed with discussion on Chapter 4. Dr. Graham identified the subgroup as Drs. Caroline Cecot and Scott Farrow.

Chapter 4:

Dr. Cecot, responded to Dr. Banzhaf's comment noting a disagreement with the proposal to delete the chapter. Alternately, the chapter could be shortened with Panel input. On section 4.1.2., the first sentence should be cut or moved to another section with further explanation. For section 4.2, Dr. Cecot agreed with public commenters that grandfathering in the context of command and control when preferential treatment of sources can occur in all approaches. Dr. Cecot echoed some suggestions received from the Institute for Policy Integrity for the revised Guidelines to name other ways to compare policy options (distributional equity). Dr. Cecot also thought it might be worthwhile for the revised Guidelines to incorporate the Institute for Policy Integrity's concept of a unified multi-pollutant approach. Dr. Cecot also supported some of Institute for Policy Integrity's assertion that the revised Guidelines were a little arbitrary on when mentioning implementation problems that might be associated with a particular policy option. She raised that one option who be to include comparative discussion in one place with a summary table at the end of the chapter. Section 4.3 was a place where the relative advantages and disadvantages of policy approaches could be compiled in a summary approach or table. For information disclosure, the revised Guideline could flag relative considerations for the effectiveness of different approaches. For liability rules, Dr. Cecot found some of the text misleading.

Dr. Cecot suggested the removal of text within the nudges discussion where it suggested that was the only area in which insights on behavioral economics are relevant. For section 4.5, representative literature should be highlighted. In section 4.6.8, Dr. Cecot thought the analyst should just be concerned with analyzing the options and their effects on selected endpoints. Section 4.7 could be refined to provide guidance for how programs can be evaluated for the future and updated over time.

Dr. Farrow noted that Dr. Cecot provided a great overview of comments on the chapter and noted his agreement with her comments. Dr. Farrow shared that he liked Dr. Cecot's idea of consistently developing comparison categories across policy tools. Dr. Farrow thought the existing Guidelines[2] have more nuanced discussion on cost-effectiveness and offered a correction on the definition of cost-effectiveness that related to whether pollutants were uniformly mixed or not.

Dr. Graham asked for comments from the other Panel members. Dr. Williams noted a question for section 4.6 relative to the target audience for the revised Guidelines. Dr. Banzhaf noted a seminar question and stated that the revised Guidelines as presented in Chapter 4, were framed more of a textbook on environmental economics rather than procedures for the EPA. Dr. Linn thought some discussion could go in an appendix to provide background on economic theory. He also shared that there should be a more balanced discussion between the pros and cons between the different regulatory options and that Chapter 8 should include some discussion on behavior economics. Dr. Frass commented that when selecting an approaches, a benefit cost analysis should be done to inform the selection. He did not see that stated within the chapter.

Dr. Graham raised a concern that Chapter 4 did not appear to focus on licensing programs of the Agency, e.g. pesticides, chemicals. A lot of policy options or instruments used in the licensing programs are a little different from what they are in the other programs, e.g. requiring a company to conduct exposure or toxicity testing to provide evidence of safety. Another panelist suggested pilot programs were another example of policy options not considered in the revised Guidelines. Dr. Graham emphasized the issue of who is going to shoulder the burden of collecting more information or doing more research should be discussed. Sometimes the EPA could request changes the behavior of industry all by itself, an option not discussed in the revised Guidelines. More discussion was needed of the ordinary issues that arise in rulemaking if you're not using regulations. Dr. Graham again pointed out the importance of a rule's "scope."

Dr. Farrow raised the possibility of a new section in Chapter 5 on comprehensiveness or completeness. Dr. Aldy suggested that the Panel might need to go through more chapters before having a better sense of where things fit. Ultimately, the revised Guidelines should have a full discussion of the importance of accounting for all the impacts and how the implementation of a regulation ends up changing things, relative to a no policy counterfactual. Dr. Graham asked panelists to think about where uncertainty should fit in the document. He thought the revised Guidelines might need more cross referencing, e.g. "uncertainty is discussed more in Chapter X."

Dr. Cecot warned against the simplifying assumptions in the revised Guidelines as costs were depicted as merely compliance costs and benefits as nonmarket effects and health outcomes. Dr. Levinson suggested the introduction to the cost chapters should say "here's what we include under costs …," including market responses to the regulation which may be cost savings. Sometimes they may be ancillary or countervailing costs or countervailing risks. Likewise, the

[2] U.S. Environmental Protection Agency. Office of Policy, National Center for Environmental Economics. (December 17, 2010; updated May 2014). Guidelines for Preparing Economic Analyses.

benefits chapter would say "here's what we're including as benefits ……" which would include non-market outcomes targeted by the regulation as well as ancillary results of the regulation which may be positive or negative. If negative, these effects could be called ancillary costs. Then the chapters proceed as written but at least with this short paragraph introducing them.

Before closing the meeting, Dr. Hill reminded lead discussants for Chapter 1 – 4 to compose their draft written responses to the charge questions by May 29, 2020. The Panel would reconvene on Thursday, May 21, 2020 and Monday, May 26, 2020 to discuss the remaining portions of the revised Guidelines document. In response to a question, Dr. Hill said there will be opportunities to categorize the Panel's recommendations (Tier 1 – 3) once the draft report is compiled. On June 9, 2020 the Panel would be able to provide some comments on the tiers as proposed in the Panel's draft report.

Meeting recessed
The meeting recessed at 1:45 p.m. EST.

May 21, 2020
Meeting reconvened
The EGRP reconvened at approximately 11:00 am EST. Dr. Hill opened the meeting providing introductory comments informing participants that the EGRP operates under FACA and federal ethics laws. Dr. John Graham, chair for the EGRP was then invited by Dr. Hill to direct the meeting. Dr. Graham conducted a roll call of the Panel and proceeded with Panel's discussion on Chapter 5. The leads for Chapter 5 were identified as Drs. Scott Farrow and Art Fraas.

Panel Discussion
Chapter 5:
Dr. Farrow indicated that he wanted to raise several points. He recommended a new section devoted to "comprehensiveness" or "completeness" where the revised Guidelines would address changes in other environmental contaminants. Dr. Farrow thought market effects and externalities could be looked at as elements of comprehensiveness. Secondly, while OMB is currently concerned only with domestic effects, it should be clarified that sensitivity analysis could be done for international impacts. Third, Dr. Farrow warned against assuming 100% compliance with a regulation. Fourth, since section 5.6 was only about the empirical investigation of uncertainty, Dr. Farrow offered remedies to expand its treatment of expected values. Dr. Farrow then noted that section 5.3.1 omits the potential rules linked by existing regulation, guidance or standard practice. Dr. Farrow also called the Panel's attention to the real options literature which provides an economics framework for why people may be slow to leave an industry or slow to adopt. Finally, Dr. Farrow noted that the terms ancillary of costs, co-benefits of costs and expected value should be included in the glossary.

Dr. Fraas said all ancillary benefits/costs should be evaluated in the RIA on an equal footing with other benefits/costs. In addition, there should be a discussion of rollback rules and how ancillary benefits/costs would be treated under rollback RIAs. Ancillary costs under the original rule become ancillary benefits under the rollback. Dr. Fraas thought the linked rules section offers an opportunity to talk about bundled rules. Sometimes the RIA just covers the aggregate rather than separating out the individual pollutant reductions. Dr. Fraas thought additional guidance was

needed to satisfy the OMB Circular A-4[3] requirement for uncertainty analysis for rules greater than $1 billion in impacts. In section 5.4, Dr. Fraas thought the revised Guidelines should require the RIA to include the transition period in the assessment of benefits and costs. Finally, Text Box 5.2 states that when possible, models and their underlying data should be publicly available. Dr. Fraas, questioned whether there would be a point where the default was not a possibility and that all data and models would be publicly available.

Dr. Graham invites other Panel member to present comments. Dr. Linn offered some additional improvements to the chapter, specifically that another rationale for having multiple baselines when a regulation is being reviewed by the courts. In addition, one criteria for evaluating a model is whether it can reproduce what's going on in the marketplace. On the option value of waiting, models that incorporate uncertainty could capture important elements of compliance decisions.

Dr. Williams pointed out that costs don't necessarily end when firms have satisfied all requirements. Since there would be additional firms coming into the market, cost analysis should account for that. Dr. Williams thought the revised Guidelines should at least acknowledge there may be technological changes to humans that might mitigate those health effects.

Dr. Aldy encouraged the Panel to think hard about what it means to the EPA to implement U.S. commitments under an international agreement. In some contexts (e.g. Montreal Protocol's addressing ozone depleting substances, Title 6 of the Clean Air Act, the United Nations Framework Convention on Climate Change and Greenhouse Gases), we undertake some action here that generate benefits outside the country but we also have other countries in the world undertaking actions that generate benefits for us. In the past, some initial RIAs of regulations to reduce chlorofluorocarbons counted in benefits for the U.S. the actions of other countries to reduce their ozone-depleting substances. That's a little different from us counting benefits to other countries from our actions but it's relevant. This issue of interdependence comes up a lot in the appropriate scope for social cost of carbon (SCC). Dr. Aldy suggested the Panel might recommend both a national estimate and an analysis that includes cross-border impacts. He also shared that the Panel may want to consider a soften option considering publicly available models and data as there are instances where use of publicly available models and data is not available. In those conditions, the EPA should be clear to identify why publicly available model and data are not used.

Dr. Graham asked the Panel for thoughts on the proposed location of discussions on uncertainly. Panelists agreed that an overview of uncertainty belongs in Chapter 5, but it could crop up in other chapters.

Dr. Aldy again mentioned the flaw in a domestic benefits only analysis which didn't take account of the benefits to the U.S. of actions in other countries. Dr. Levinson said the implementation of international agreements on climate would need to consider the costs, not just

[3] U.S. Office of Management and Budget. (2003). Circular A-4, Regulatory Analysis, September 17, 2003. http://www.whitehouse.gov/omb/circulars_a004_a-4/.

benefits, can be born domestically and internationally. Dr. Graham suggested the Panel drop a footnote to a National Academy of Sciences report on domestic-only construct and how it misses ancillary effects abroad that impact the U.S.

Dr. Cecot said she thought the objective of the regulation was to solve the environmental problem and this kind of statement would obviate the need for RIAs getting into the statutory language. Dr. Graham spoke about an extensive literature about how regulatory agencies operate in tunnel vision and only look at the benefits and costs that relate to the proximate issue they're trying to solve. Dr. Aldy said he would like the EPA to be more explicit in the revised Guidelines for counting the things they call "co-benefits."

Dr. Clay said she envisioned ancillary benefits and countervailing risks appearing in Chapter 7, but that Chapter 5 would set the stage and refer readers to Chapter 7.

The Panel then proceed to discuss Chapter 7. Dr. Graham noted the subgroup for Chapter 7 as Drs. Karen Clay, Joe Aldy, and Craig Landry.

Chapter 7:

Dr. Clay thought the chapter was generally in good shape. She noted that her preliminary comments are organized by charge question and tier (level of recommendation). Dr. Clay shared that she would prefer seeing non-environmental benefits (e.g. cost savings) incorporated in Figure 7.1 and Table 7.1 which seemed unnecessarily narrow. She suggested that the EPA incorporate non-environmental benefits like cost savings. She also thought Chapter 7 would benefit from a discussion of the age distribution from mortality. Noting that public commenters raised the question of the Value of Statistical Life (VSL) versus the Value of Statistical Life Years (VSLY), Dr. Clay found it to focus on VSL persuasive. Dr. Clay thought that the reporting of age distribution in the text of Chapter 7 would be useful.

On the Costs of Illness (COI) section, Dr. Clay spoke about the value of developing morbidity Willingness to pay (WTP) to help bridge the incongruence between very high VSL estimates and low COI estimates. She called for more clarity in the text boxes so that the take-away point was clearer. Discussion in the revised Guidelines of underlying assumptions about rationality could be improved.

Dr. Aldy said he was focusing on VSL because it was the single most important measure in the EPA's regulatory analysis, forming the basis for 80% of all monetized benefits in regulatory programs. EPA was continuing to use a set of studies with an average publication date of 1985 and most of the hedonic wage studies or contingent valuation studies would not satisfy our standards today for quality. VSL should at least be adjusted for growing income levels. The discussion in Chapter 7, according to Dr. Aldy, was incomplete and ambiguous. At a minimum, it should be updated with newer papers that show how VSL varies over the lifecycle.

With respect to the valuation discussion in Chapter 7, Dr. Landry said the EPA defined WTP without mentioning Willingness to Accept (WTA) and seemed to suggest later on that WTP indicated both WTP and WTA. EPA seemed to overlook revealed preference choice models which can be used to value benefits. Prices could be used as a proxy for opportunity costs in

welfare analysis, but the caveat should always be added that we're assuming a competitive market. Regarding specific models and methods, the EPA needs to clarify the array of recreation demand models that can be estimated (single-site demand model, a system of demand equations, a site choice model, a repeated site choice model). Dr. Landry thought the revised Guidelines could discuss these rules of thumb for calculating the costs of time. Dr. Landry offered some corrections to the EPA's discussion of calculating the cost of recreation.

Dr. Landry offered more caveats to the EPA's discussion of substitute prices in demand modeling and elaborated on ways to deal with multi-purpose trips. On the subject of stated preference, Dr. Landry thought the EPA's emphasis on the National Oceanic and Atmospheric Administration report was outdated. On choice experiments and contingent valuation, EPA needed to add discussion of the use of consequences in trying to prime respondents to answer rationally. On the modeling of public goods provision, Dr. Landry thought the difficulty of such modeling had been overemphasized by the EPA given recent experiments simulating public goods provision. Dr. Landry thought the chapter's discussion of representative agent models should be expanded to discuss heterogeneity and its discussion of WTP/WTA should explain how the assignment of property rights affects these results.

Dr. Graham invited other Panelists to comment on Chapter 7. Dr. Farrow noted that the chapter was micro oriented. This chapter could point ahead to Text Box 8-2 regarding the benefit estimated based on Computable General Equilibrium (CGE) models. Dr. Fraas thought there was not enough discussion in Chapter 7 about some of the ancillary benefits like fuel cost savings. Dr. Graham agreed that the numbers that come out of the energy savings are powerful, sometimes even more important the SCC and VSL, and thus merited serious treatment in the revised Guidelines.

Panelists returned to the need for an update of the VSL and Dr. Graham pondered whether the Panel should recommend a more in-depth process that accounts for the more recent literature.

Dr. Nathalie Simon of the EPA's National Center for Environmental Economics (NCEE) told them about the 2017 SAB report[4] on a proposed meta-analysis by NCEE. The SAB report offered a number of recommendations at that time.

The Panel held a break, returning at 1:15 pm EST. Dr. Graham conducted a roll call and then reminded panelists to allocate their comments into the various charge questions to fit into the SAB report template. Dr. Graham proceed with discussion on Chapter 9, identifying the subgroup as Drs. Dan Black and Spencer Banzhaf.

Chapter 9:

Dr. Black commented that the consistency of Chapter 9, empirically and theoretically, held up to scrutiny. To improve the chapter, the EPA might address the need to deal with other economic structures when perfect competition is lacking, expand its consideration of the heterogeneity of

[4] U.S. EPA SAB (2017). SAB Review of EPA's Proposed Methodology for Updating Mortality Risk Valuation Estimates for Policy Analysis, EPA-SAB-17-005. February 23, 2017. https://yosemite.epa.gov/sab/sabproduct.nsf/02ad90b136fc21ef85256eba00436459/436C15984A487E1F852580D0004429CF/$File/EPA-SAB+2017-005+Unsigned.pdf.

impacts and address capital market imperfections. Other topics that warrant more discussion include how land markets impacts renters versus property owners, the effects of plant closures on older workers, effects of environmental policies on migration and socio-cultural effects on small communities.

Dr. Banzhaf commented that Chapter 9 begins by using OMB Circular A-4 as precedent for discussing distributive effects. In thinking about what is the distributional objective, Dr. Banzhaf thought a social welfare function would be appropriate when analyzing distributional effects. Uncertainty about a nonmarket benefit, he said, does not justify a value of zero nor does uncertainty about weight justify an assumption of equal weights across income groups. Dr. Banzhaf envisioned one synthesized distributional analysis that would account simultaneously for the distribution of costs and benefits across groups. Although any such social welfare function would be arbitrary, so is the current assumption that the marginal utility of a dollar is constant across income groups. Overall, the revised Guidelines underestimate the social effects of unemployment. Dr. Banzhaf reiterated Dr. Black's comment that shutting down a coal mine had a different effect on a 25-year old versus a 55-year old.

Dr. Graham invited others on the Panel to comment. Dr. Farrow spoke about how a first cut impact analysis could drive an analysis of direct and co-benefits, given its unearthing of a complex set of interactions (unemployment, profits, changes in budgets). In response to a question from Dr. Graham, Dr. Banzhaf said environmental justice (Chapter 10) would be a special case of distributional effects (Chapter 9).

Dr. Levinson suggested this part of the revised Guidelines could take the opportunity to educate a little about why the state of the economy matters to the interpretation of employment effects. Others agreed it would be good to bring up an introductory paragraph or two on unemployment and state of the economy issues here in Chapter 9.

Dr. Graham worried about accounting for the business cycle in cost-benefit analysis, a tricky business since a regulation could start in one part of the cycle and end in another part of the cycle. Dr. Farrow suggested sensitivity analysis where the default is full employment.

Hearing no further comments on Chapter 9, Dr. Graham proceed with discussion on Chapter 10. He identified the subgroup as Drs. Spencer Banzhaf and Richard Williams.

Chapter 10:

Dr. Banzhaf repeated his desire to see greater emphasis on net benefits to different groups. EPA's current definition of environmental justice includes meaningful involvement of disadvantages groups. Dr. Banzhaf would encourage the EPA to think about the degree of meaningful involvement from different groups in the choice of policy.

Dr. Williams noted that decision makers were not offered ways to remedy distributional effects in RIAs so one potential improvement would be to offer policy remedies for distributional effects. Dr. Williams also preferred a greater focus on wealth-health analysis and listed the ways in which income affect the health of individuals, citing a recent study that shows a 1% increase in unemployment led to an opioid death rate rises by 3.6%.

Dr. Graham shared that he participated in a project that looked at the question of whether the benefits and costs of regulation are distributed progressively or regressively with respect to income. Since energy prices are a key effect of environmental regulations, he wasn't sure whether Chapter 10 gives adequate credence to the fact that working- class groups were the most hurt by higher energy prices. Dr. Graham also mentioned the ramifications of a broader social welfare approach would include evaluating the WTP of low- income groups and, thus, a lower VSL for lower income groups. He asked whether the Panel would recommend an income based VSL for the purpose of doing the distributional analysis?

Dr. Levinson pointed out that the EPA's definition of environmental justice isn't about net benefits. It was just about the distribution of environmental outcomes. Dr. Levinson suggested the Panel could say something like "A fuller analysis would encompass the economic as well as the environmental outcomes." Dr. Farrow said a social welfare approach is an aspirational goal. Dr. Williams suggested looking at the Small Business Administration's language.

Dr. Graham asked panelists to think about their consensus recommendations on distributional effects and environmental justice. A table of net benefits by group was suggested as an intermediate goal (short of a full social welfare function). Dr. Graham said he was more sympathetic with use of Adler's approach, which builds off the progressivity of the income tax. He expressed a concern that the Panel would get the EPA far afield from their mandate. A more general comment from the Panel would simply encourage EPA to look at impacts on low income groups and point to the increased literature on distributional analysis and environmental justice.

In closing, Dr. Graham reminder the Panel of their next meeting date (May 26, 2020), where they would address the remaining chapters and appendices. Dr. Hill reminded the Panel of the May 29, 2020 deadline for submitting their draft responses to charge questions and recessed the meeting.

Meeting recessed
The meeting recessed at 2:40 p.m. EST.

May 26, 2020
Meeting reconvened
The EGRP reconvened at approximately 11:00 am EST. Dr. Hill opened the meeting providing introductory comments informing participants that the EGRP operates under FACA and federal ethics laws. She then turned the meeting over to Dr. Graham. Dr. Graham reviewed the agenda noting the chapters for discussion and that the presentation of clarifying public comments. Dr. Graham conducted a roll call of the Panel and provided comments for Chapter 11.

Panel Discussion
Chapter 11:
Dr. Graham suggested some refinements to Chapter 11. He suggested examples were needed on page 11-2 of benefits and costs that could not be quantified and monetized. Non-quantified costs and non-quantified countervailing risks should also be added to the discussion of cost and benefits. For Tables 11.1 – 11.4, a caveat is needed to explain the underlying assumption that this is all done from the perspective of a regulatory action where you're securing benefits and

you may have economic costs and a deregulatory action would reverse some of these things. Countervailing risks should be added to the tables. A summary table is needed for costs which would include non-quantified costs, non-monetized costs and countervailing risks.

Dr. Graham suggested if WTP estimates were not available for different health endpoints, then it is feasible for EPA to utilize the integrated health indices from the literature. In this regard, the Institute of Medicine 2006 report could be cited. Dr. Graham offered some clarifications on the use of the Monte Carlo term and made specific suggestions on basic level of sensitivity analysis.

Dr. Levinson said he was perplexed as to why some RIAs presented costs and benefits in annualized terms, sometimes as a Net Present Value or costs/benefits in a future year. It's not always clear why a given choice was made. He would prefer that the revised Guidelines state that the RIA should explain why it made the choice it made.

Dr. Aldy noticed a sentence that had been changed since the previous version of the revised Guidelines, omitting reference to ancillary impacts. Dr. Aldy thought ancillary impacts should always be included. With no further comments raised, Dr. Graham proceed with his review of Appendix A.

Appendix A:
Dr. Graham suggested that the EPA could omit Appendix A and simply refer the reader to an updated textbook in welfare economics. Several panelists agreed. Dr. Farrow said if the Panel adopted the idea of omitting Appendix A, there would need to be more basic information on externalities in the body of the revised Guidelines.

With no further comments raised, Dr. Graham proceed with his review of Appendix B.

Appendix B:
Dr. Graham commented that changes as discussed for Chapter 7 regarding VSL should be reflected in Appendix B. Dr. Aldy said he and Dr. Clay would take responsibility for writing draft responses to charge questions on both Chapter 7 and Appendix B.

Dr. Graham reminded panelists there was a 2017 SAB report on VSL. Dr. Williams wondered whether the Panel should say something more about VSLY given its potential importance. He thought the revised Guidelines should at least state that the EPA would monitor the research on VSLY. Dr. Aldy said his own revealed preference work and other work shows that VSLY varies over the life cycle and it was good to remind the EPA of that. He thought the EPA could be more explicit in referencing a broader literature about the challenges of VSLY.

Dr. Banzhaf returned the Panel's attention to Chapter 9 in which he advocated for a distributional analysis of net benefits with age-specific heterogeneity in VSL. Dr. Aldy said age specific VSLs would be a difficult issue politically, even if only in the distributional analysis. Dr. Graham noted the revised Guidelines had listed other characteristics of risk, not just age, on page B-4. Dr. Graham hearing no further comments, then directed the Panel's discussion for Chapter 6. He identified the subgroup as Drs. Joe Aldy and Art Fraas.

Chapter 6:
Dr. Aldy noted the discount rate is the only real parameter in the EPA's analysis that is dictated by OMB whose guidance is very specific about 3% and 7% in OMB Circular A-4. Dr. Aldy thought the EPA could be less deferential to OMB given future OMBs might update the guidance. Dr. Aldy commented that the EPA should be very explicit about the economic context and policy context, especially since it might spur OMB to update their guidance.

Dr. Aldy said economists would prefer to see a Net Present Value of the benefit and cost stream over time. Instead, the EPA was using a snapshot of a future year at full implementation. In a recent review of more than 40 Clean Air Act RIAs, more than 80% of RIAs used a snapshot year on benefits while annualizing costs. This created an apples and oranges problem. Dr. Aldy thought the revised Guidelines should emphasize annualized benefits, not a simple snapshot year, for characterizing benefits. Dr. Aldy pointed out that in a lot of rules, the EPA is looking for an appropriate time horizon (T). If T is really far into the future, it could overlap the next rulemaking. Dr. Aldy stated that the EPA must be clear about its choice of time horizon and implications it has for discount rates. Dr. Aldy's final point was that consistency of assumptions with respect to economic growth was important when forming a discount rate or estimating the SCC.

Dr. Fraas thought it could be appropriate to use a higher discount rate than the consumption rate of interest for benefit categories with intergenerational benefits or costs. Dr. Fraas suggested the Panel recommend the revised Guidelines include a recommendation for a discount rate that is higher than the consumption rate of interest. The higher discount rate is a proxy for the social opportunity cost of capital. Everyone is left no better or worse off with this approach. It ensures there are no other uses of investment capital that would enable everyone to be better off. Dr. Fraas described a certain awkwardness in the EPA's RIAs when different discount rates were applied to different benefit and cost streams. For the consumption rate of interest, he noticed a difference in definitions between the glossary and Chapter 6. He also pointed out a glitch in Text Box 6.6.

Dr. Farrow again reminded the Panel of the importance of sensitivity analysis. Dr. Aldy cited papers from Maureen Cropper and Kenneth Arrow that discuss declining discount rates across generations while effects in any given year would be discounted the same. Declining discount rates can be applied on a year-by-year basis over time so that it results in appropriate apples-to-apples comparison.

Dr. Fraas said he would prefer a lower rate so long as it were consistently applied to benefits and costs and the Integrated Assessment Models for SCC would have to reflect the same discount rate.

Dr. Farrow pointed out the issue of nominal versus real rates goes by with just a sentence or two in Chapter 6. More elaboration is needed for the analyst. In response to a question from Dr. Graham, Dr. Aldy explained that after the report from the Interagency Working Group on Social Cost of Carbon, RIAs were still using 3% and 7% while explaining that 2.5%, 3% and 5% were used to calculate SCC. That resulted in an apples and oranges problem.

Dr. Graham then directed the Panel to the discussion of Chapter 8. He identified the subgroup as Drs. Joshua Linn and Arik Levinson.

Chapter 8:
Dr. Linn complimented the EPA on the impressive work represented by the revised Guidelines. First, Dr. Linn pointed out that the welfare effects of a regulation can depend upon market structure. When firms have market power, that will create a wedge between market price and market costs. Ideally, the EPA's analysts would use a model that captures that. Failing that, the revised Guidelines should include some discussion of the implications of market power for welfare analysis. The literature on acid rain has emphasized the role of market power in input markets, e.g. railroads delivering coal.

Secondly, Dr. Linn spoke about behavioral economics and its findings that consumer choices may not conform to expected choices from the standard neoclassical model. For example, consumers haven't always optimized around energy efficiency, even when prices point them in the right direction. Irrational behavior is said to exist in the purchase of vehicles, energy products, etc. There are different ways to incorporate these mistakes into welfare analysis and it depends on why consumers are behaving the way they do. We might be able to use a standard utility maximization framework but if there is an anchoring bias, a more sophisticated way might be needed to account for that behavior in the welfare analysis. The revised Guidelines should discuss these choices.

On model parameterization, Dr. Linn praised the section of Chapter 8 that discusses model parameterization. Dr. Linn added that if the analyst is estimating parameters, the assumptions used to estimate parameters should be consistent with the assumptions in the model. This was not the case with the light duty fuel economy greenhouse gas rollback RIA which was estimated under inconsistent assumptions. In addition, the revised Guidelines should make clear the analyst should use the most recent data possible, something that did not happen with the recent rollbacks of mercury and air toxics regulations. Finally, on CGE models; the revised Guidelines need more specificity about when a CGE model is needed.

Dr. Levinson called the Panel's attention to several corrections offered in his preliminary comments, specifically Figure 8.2, footnote 244, Figure 8.3 and footnote 269. On Text Box 8.1, Dr. Levinson called the Panel's attention to the last paragraph where it says that the EPA could improve its ability to conduct retrospective analysis by identifying analytic requirements at the time the regulation is promulgated. In the discussion of Gross Domestic Product (GDP) on page 8-11, Dr. Levinson said he would add a sentence explaining that GDP does not include costs or benefits of environmental regulation. In a correction to footnote 242, Dr. Levinson said he would prefer to say that market distortions move us away from "what would be economically efficient." Other minor points are captured in Dr. Levinson's preliminary comments.

Other panelists were then invited to offer comments on Chapter 8. Dr. Fraas raised the issue of Executive Order 13563 on Improving Regulation and Regulatory Review in which the EPA is supposed to be putting together a plan to identify what retrospective costs and analyses it might do, wondering whether it could be interpreted as a mandate to do retrospective analysis.

Dr. Farrow said the discussion of unemployment effects on page 8-14 should be slightly more optimistic and say that such effects "may be included." Dr. Graham said he thought the chapter jumped quickly into sophisticated economic modelling before the basic engineering and accounting perspectives on identifying costs. As an example, he envisioned a box using the greenhouse gas motor vehicle rule showing how robust identification of cost can help the analyst keep track of his work. Again, costs should be defined to include ancillary costs and countervailing risks.

Lastly, Dr. Linn added that Chapter 8 should have some discussion of the uncertainty that can happen with legal challenges to regulations and their effects on compliance decisions by firms. Dr. Graham expressed a wish to see a unified treatment of retrospective analysis, probably in Chapter 5.

Dr. Graham reminded panelists to organize their drafts according to the charge questions and to incorporate the Panel's discussion of the relevant issues. Dr. Hill reiterated the drafts were due May 29, 2020. Dr. Graham asked if the deadline could be extended. Dr. Hill agreed to June 1, 2020. Dr. Hill reminded the Panel and public that the next teleconference would ensue on June 9, 2020 to discuss the Panel's draft report.

Dr. Ann Wolverton of NCEE interjected to make a clarifying comment on CGE models. Dr. Wolverton told the Panel that the revised Guidelines has a CGE discussion that was inadvertently removed from the draft document being reviewed by the Panel. Dr. Wolverton read the missing text which specified when a CGE model was appropriate to the Panel.

Clarifying comments:
Dr. Hill noted there were two requests for clarifying comments.

Mr. Schwartz (Institute for Policy Integrity) said some issues require a global perspective. If a domestic-only approach ignores key effects on U.S. citizens, then the analysis will be incomplete. OMB Circular A-4 says different regulations call for different emphases. A SCC based on domestic-only effects fails to account for the effects of U.S. actions on others and the effects of their actions on us. It's also inaccurate, derived from an arbitrary comparison of U.S. versus European coastline lengths. Mr. Schwartz said his main emphases were on the statutory requirements, the accuracy and need to include effects that matter to U.S. citizens, and need for consistency.

In response to a question from Dr. Graham, Mr. Schwartz said the National Environmental Policy Act embraced a global perspective; and under the Clean Air Act, the key phrase was "public welfare." Once all effects are considered, the strategic SCC for all countries is higher than their domestic SCC. Just because the U.S. has a shorter coastline than Europe, it does not follow that we must ignore global climate effects.

Dr. McGartland (Director, EPA's NCEE) thanked the Panel for its constructive comments. Dr. McGartland offered three points about the revised Guidelines. The revised Guidelines (1) were written for the analyst at the EPA who have two responsibilities: perform analysis and inform decision makers; (2) try to stay faithful to the established literature rather than breaking new

ground; and (3) the technical audience should not be making policy calls. On VSL, Dr. McGartland told the Panel that NCEE had gone to the SAB three times. SAB panels have historically said different things from one panel to the other. NCEE was now trying to incorporate all the analytic requests made by the last SAB panel.

Meeting adjourned:
The meeting was adjourned at approximately 2:45 p.m. EST.

Respectfully Submitted on behalf of the Panel and Certified as Accurate,

/s/	/s/
Dr. Shaunta Hill-Hammond	Dr. John Graham
DFO	EGRP Chair

NOTE AND DISCLAIMER: The minutes of this public meeting reflect diverse ideas and suggestions offered by committee members during the course of deliberations within the meeting. Such ideas, suggestions, and deliberations do not necessarily reflect definitive consensus advice from the panel members. The reader is cautioned to not rely on the minutes to represent final, approved, consensus advice and recommendations offered to the Agency. Such advice and recommendations may be found in the final advisories, commentaries, letters, or reports prepared and transmitted to the EPA Administrator following the public meetings.

Attachment A: Additional meeting participants in attendance or who requested the teleconference call-in number.

Name	Affiliation
Amena Saiyid	Bloomberg Industry Group
Anthony Dvarskas	NY Attorney General
Audrey Lyke	Exelon
Dave Rostker	Small Business Administration
Doug Obey	Inside EPA
Jason A. Schwartz	Institute for Policy Integrity
Jonathan D Gledhill	Policy Navigation Group
Max Sarinsky	Institute for Policy Integrity at NYU School of Law
Rachel Lange	Food and Drug Administration
Robert D. Cheren	Baker Hostetler Law
Ryan Finseth	South Coast Air Quality Management District
Sean Reilly	E&E News
Tayyaba Zeb	Small Business Administration
Walton Francis	--
Al McGartland	U.S. EPA
Alex Marten	U.S. EPA
Amy Lamson	U.S. EPA
Andrew Schreiber	U.S. EPA
Ann Ferris	U.S. EPA
Ann Wolverton	U.S. EPA
Brett Snyder	U.S. EPA
Charles Griffiths	U.S. EPA
Chris Dockins	U.S. EPA
David Evans	U.S. EPA
Elizabeth Kopits	U.S. EPA
Heather Klemick	U.S. EPA
Holly Stallworth	U.S. EPA
Jennifer Bowen	U.S. EPA
Ken Munis	U.S. EPA
Kevin Wheeler	U.S. EPA
Khanna Johnston	U.S. EPA
Nathalie Simon	U.S. EPA
Nathan Pfisterer	U.S. EPA
Robin Jenkins	U.S. EPA
Sue Shallal	U.S. EPA
Thomas Brennan	U.S. EPA
Will Wheeler	U.S. EPA

Materials Cited:

The following meeting materials are available on the SAB website (http://www.epa.gov/sab) at the page for the May 18, 2020.
https://yosemite.epa.gov/sab/sabproduct.nsf/a84bfee16cc358ad85256ccd006b0b4b/a7e98fa28e40593a852585520058733a!OpenDocument&Date=2020-05-18

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[i] Panel roster

[ii] Guidelines for Preparing Economic Analyses

[iii] List of Registered Public Speakers Revised.