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**EPA's Denial of the Petitions To
Reconsider the Endangerment and Cause
or Contribute Findings for Greenhouse
Gases Under Section 202(a) of the Clean
Air Act; Final Rule**

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Chapter 1

[EPA-HQ-OAR-2009-0171; FRL-9184-8]

EPA's Denial of the Petitions To Reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act

AGENCY: Environmental Protection Agency (EPA).

ACTION: Notice, denial of petitions to reconsider.

SUMMARY: The Environmental Protection Agency (EPA) is denying the petitions to reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act. The Findings were signed by the Administrator on December 7, 2009. EPA has carefully reviewed all of the petitions and revisited both the scientific record and the Administrator's decision process underlying the Findings in light of these petitions. EPA's analysis of the petitions reveals that the petitioners have provided inadequate and generally unscientific arguments and evidence that the underlying science supporting the Findings is flawed, misinterpreted or inappropriately applied by EPA. The petitioners' arguments fail to meet the criteria for reconsideration under the Clean Air Act. The science supporting the Administrator's finding that elevated concentrations of greenhouse gases in the atmosphere may reasonably be anticipated to endanger the public health and welfare of current and future U.S. generations is robust, voluminous, and compelling, and has been strongly affirmed by the recent science assessment of the U.S. National Academy of Sciences.

DATES: This denial is effective July 29, 2010.

ADDRESSES: EPA's docket for this action is Docket ID No. EPA-HQ-OAR-2009-0171. All documents in the docket are listed on the <http://www.regulations.gov> Web site. Although listed in the index, some information is not publicly available, e.g., confidential business information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available either electronically through <http://www.regulations.gov> or in hard copy at EPA's Docket Center, Public

Reading Room, EPA West Building, Room 3334, 1301 Constitution Avenue, NW., Washington, DC 20004. This Docket Facility is open from 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number for the Public Reading Room is (202) 566-1744, and the telephone number for the Air Docket is (202) 566-1742.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION:

Acronyms and Abbreviations. The following acronyms and abbreviations are used in this Decision.

ACUS Administrative Conference of the United States
 ANPR Advance Notice of Proposed Rulemaking
 APA Administrative Procedure Act
 CAA Clean Air Act
 CAFE Corporate Average Fuel Economy
 CAIT Climate Analysis Indicators Tool
 CBI confidential business information
 CCSP Climate Change Science Program
 CFR Code of Federal Regulations
 CH₄ methane
 CO₂ carbon dioxide
 CRU Climatic Research Unit
 DOT U.S. Department of Transportation
 EISA Energy Independence and Security Act
 EO Executive Order
 EPA U.S. Environmental Protection Agency
 EPCA Energy Policy and Conservation Act
 FOIA Freedom of Information Act
 FR Federal Register
 GHG greenhouse gas
 HadCRUT Climatic Research Unit (CRU) temperature record
 ICTA International Center For Technology Assessment
 IPCC Intergovernmental Panel on Climate Change
 MWP Medieval Warm Period
 N₂O nitrous oxide
 NAAQS National Ambient Air Quality Standards
 NAS National Academy of Sciences
 NASA National Aeronautics and Space Administration
 NHTSA National Highway Traffic Safety Administration
 NOAA National Oceanic and Atmospheric Administration
 NO_x nitrogen oxide
 NRC National Research Council
 NSPS new source performance standards
 PM particulate matter
 PSD Prevention of Significant Deterioration

TSD technical support document
 U.S. United States
 UNFCCC United Nations Framework Convention on Climate Change
 USGCRP U.S. Global Change Research Program
 WMO World Meteorological Organization

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I. Introduction

A. Summary

This is EPA's response denying the petitions to reconsider the Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act ("Findings" or the "Endangerment Finding") (74 FR 66496, December 15, 2009). EPA has considered all 10 petitions, including the arguments presented therein and the supplemental information provided by the petitioners as supporting evidence of their claims. EPA has evaluated the merit of the petitioners' arguments in the context of the entire body of scientific and other evidence before the Agency. This response (hereafter "Denial" or "Decision") provides EPA's scientific and legal justification for denying these petitions. This Denial is accompanied by a 3-volume, roughly 360-page Response to Petitions (RTP) document (<http://www.epa.gov/climatechange/endorsement.html>), containing further responses and technical detail concerning every significant claim and assertion made by the petitioners. Section III of this Decision summarizes many of the responses provided in the RTP document.

After a comprehensive, careful review and analysis of the petitions, EPA has determined that the petitioners' arguments and evidence are inadequate, generally unscientific, and do not show that the underlying science supporting the Endangerment Finding is flawed, misinterpreted by EPA, or inappropriately applied by EPA. The science supporting the Administrator's finding that elevated concentrations of greenhouse gases in the atmosphere may reasonably be anticipated to endanger the public health and welfare of current and future U.S. generations is robust, voluminous, and compelling. The most recent science assessment by the U.S. National Academy of Sciences strongly affirms this view. In addition, the approach and procedures used by EPA to evaluate the underlying science demonstrate that the Findings remain robust and appropriate.

Petitioners generally argue that recent revelations show that the science supporting EPA's Endangerment Finding was flawed or questionable, and that EPA should therefore reconsider the Endangerment Finding. The petitioners' arguments and claims are based largely on disclosed private communications among various scientists, a limited number of errors and claimed errors in the 2007 Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment

Report (AR4),¹ and submissions of a limited number of additional studies not previously considered as part of the scientific record of the Endangerment Finding.

As discussed in detail throughout this Decision and in fuller detail in the RTP document, petitioners' claims and the information they submit do not change or undermine our understanding of how anthropogenic emissions of greenhouse gases cause climate change and how human-induced climate change generates risks and impacts to public health and welfare. This understanding has been decades in the making and has become more clear over time with the accumulation of evidence. The information provided by petitioners does not change any of the scientific conclusions that underlie the Administrator's Findings, nor do the petitions lower the degrees of confidence associated with each of these major scientific conclusions.

More specifically, the petitions do not change EPA's proper characterization of the current body of knowledge and our ability to state with confidence our conclusions in the following key areas of greenhouse gas and climate change science: (1) That anthropogenic emissions of greenhouse gases are causing atmospheric levels of greenhouse gases in our atmosphere to rise to essentially unprecedented levels in human history; (2) that the accumulation of greenhouse gases in our atmosphere is exerting a warming effect on the global climate; (3) that there are multiple lines of evidence, including increasing average global surface temperatures, rising ocean temperatures and sea levels, and shrinking Arctic ice, all showing that climate change is occurring, and that the observed rate of climate change stands out as significant compared to recent historical rates of climate change; (4) that there is compelling evidence that anthropogenic emissions of greenhouse gases are the primary driver of recent observed increases in average global temperature; (5) that atmospheric levels of greenhouse gases are expected to continue to rise for the foreseeable future; and (6) that risks and impacts to public health and welfare are expected to grow as climate change continues, and that climate change over this century is expected to be greater compared to observed climate change over the past century.

¹ IPCC (2007). Fourth Assessment Report: Climate Change 2007. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

The core defect in petitioners' arguments is that these arguments are not based on consideration of the body of scientific evidence. Petitioners fail to address the breadth and depth of the scientific evidence and instead rely on an assumption of inaccuracy in the science that they extend even to the body of science that is not directly addressed by information they provide or by arguments they make. This assumption of error is based on various statements and views expressed in some of the e-mail communications between scientists at the Climatic Research Unit (CRU) of the University of East Anglia in the United Kingdom and several other scientists ("the CRU e-mails")². As EPA's review and analysis shows, the petitioners routinely take these private e-mail communications out of context and assert they are "smoking gun" evidence of wrongdoing and scientific manipulation of data. EPA's careful examination of the e-mails and their context shows that the petitioners' claims are exaggerated, are often contradicted by other evidence, and are not a material or reliable basis to question the validity and credibility of the body of science underlying the Administrator's Endangerment Finding or the Administrator's decision process articulated in the Findings themselves. Petitioners' assumptions and subjective assertions regarding what the e-mails purport to show about the state of climate change science are clearly inadequate pieces of evidence to challenge the voluminous and well documented body of science that is the technical foundation of the Administrator's Endangerment Finding.

Inquiries from the UK House of Commons, Science and Technology Committee, the University of East Anglia, Oxburgh Panel, the Pennsylvania State University, and the University of East Anglia, Russell Panel,³ all entirely independent from EPA, have examined the issues and many of the same allegations brought forward by the petitioners as a result of the disclosure of the private CRU e-mails. These inquiries are now complete. Their conclusions are in line with EPA's review and analysis of these same CRU e-mails. The inquiries have

² All of the disclosed CRU e-mails at issue in this Decision can be found in full in EPA's docket for the Endangerment Finding. See Docket ID No. EPA-HQ-OAR-2009-0171, "CRU E-mails 1996-2009."

³ These inquiries plus another addressing IPCC AR4 issues are referred to throughout this Decision and the RTP document. Every inquiry is provided in full in EPA's docket for the Endangerment Finding. See Docket ID No. EPA-HQ-OAR-2009-0171, "Recent Inquiries and Investigations of the CRU E-mails and the IPCC Fourth Assessment Report."

found no evidence of scientific misconduct or intentional data manipulation on the part of the climate researchers associated with the CRU e-mails. The recommendation for more transparent procedures concerning availability of underlying data appears appropriate, but it has not cast doubt on the underlying body of science developed by these researchers. These inquiries lend further credence to EPA's conclusion that petitioners' claims that the CRU e-mails show the underlying science cannot or should not be trusted are exaggerated and unsupported.

Petitioners' also point to a limited number of factual mistakes in IPCC AR4, some confirmed, some alleged, to argue that the climate science supporting the Administrator's Endangerment Finding is flawed. EPA's review confirmed two factual mistakes. These two confirmed instances of factual mistakes are tangential and minor and do not change the key IPCC AR4 conclusions that are central to the Administrator's Endangerment Finding. While it is unfortunate that IPCC's review process did not catch these errors, in the context of a report of this size and scope (almost 3,000 pages), it is an inappropriate and unfounded exaggeration to claim that these two confirmed mistakes delegitimize all of the scientific statements and findings contained in IPCC AR4. To the contrary, given the scrutiny to which IPCC AR4 has been subjected, the limited nature of these mistakes demonstrates that the IPCC review procedures have been highly effective and very robust.

In a limited number of cases, the petitioners identify new scientific studies and data, published since the Endangerment Finding was finalized, which they claim require EPA to reconsider the Endangerment Finding. Some petitioners also argue that EPA ignored or misinterpreted scientific data that were significant and available when the Finding was made. EPA's review of these claims shows that in many cases the issues raised by the petitioners are not new, but were in fact considered prior to issuing the Endangerment Finding. In other cases, the petitioners have misinterpreted or misrepresented the meaning and significance of recent scientific literature, findings, and data. Finally, there are instances in which the petitioners have failed to acknowledge other new studies in making their arguments. The RTP document contains study-by-study analysis of these failed arguments on the part of petitioners.

Finally, in May 2010, the National Research Council (NRC) of the U.S. National Academy of Sciences published its comprehensive

assessment, "Advancing the Science of Climate Change"⁴ (NRC, 2010). It concluded that "climate change is occurring, is caused largely by human activities, and poses significant risks for—and in many cases is already affecting—a broad range of human and natural systems." Furthermore, the NRC stated that this conclusion is based on findings that are "consistent with the conclusions of recent assessments by the U.S. Global Change Research Program, the Intergovernmental Panel on Climate Change's Fourth Assessment Report, and other assessments of the state of scientific knowledge on climate change." These are the same assessments that served as the primary scientific references underlying the Administrator's Endangerment Finding. Importantly, this recent NRC assessment represents another independent and critical inquiry of the state of climate change science, separate and apart from the previous IPCC and U.S. Global Change Research Program (USGCRP) assessments. The NRC assessment is a clear affirmation that the scientific underpinnings of the Administrator's Endangerment Finding are robust, credible, and appropriately characterized by EPA.

The endangerment to public health and welfare from atmospheric concentrations of greenhouse gases and associated climate change is too important an issue to be decided on any grounds other than a close and comprehensive scrutiny of the entire body of the scientific evidence. This principle calls for an outright rejection of the petitioners' arguments. The petitioners' arguments amount to a request that EPA ignore the deep body of science that has been built up over several decades and the direction it points in, and to do so based not on a careful and comprehensive analysis of the science, but instead on what amount to assertions and leaps in logic, unsupported by a rigorous examination of the science itself. The petitioners do not provide any substantial support for the argument that the Endangerment Finding should be revised. Therefore, none of the petitioners' objections are of central relevance to the considerations that led to the final Endangerment Finding. In addition, in many cases these arguments by the petitioners either were or could have been raised during the comment period on the Endangerment Finding. In summary, EPA's thorough review of petitioners' arguments shows that the petitioners

have not met the criteria for reconsideration under section 307(d) the Clean Air Act (CAA).⁵

B. Background

The Findings were signed by the Administrator on December 7, 2009, were published in the **Federal Register** on December 15, 2009, and became effective January 14, 2010. The Administrator's Endangerment Finding concluded that atmospheric concentrations of the group of six greenhouse gases are reasonably anticipated to endanger both the public health and public welfare of current and future U.S. generations. The Administrator also decided that the combined emissions of greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas air pollution that endangers both public health and public welfare (*i.e.*, the second finding or "cause or contribute" finding). These Findings were made under CAA section 202(a). The Findings were also supported by a Technical Support Document (TSD) (Docket EPA-HQ-OAR-2009-0171-11645), containing the underlying greenhouse gas emissions data and a synthesis of climate change science, as well as an 11-volume RTC document (Docket EPA-HQ-OAR-2009-0171) that provides EPA's responses to all significant public comments that had been received during the 60-day public comment period following the Administrator's proposed Findings, signed April 17, 2009.

Since finalization of the Findings in December 2009, EPA has received 10 petitions and supplements thereto requesting that EPA reconsider the Findings. The general bases of the petitions are the following: (1) Recent disclosure of private e-mail communications among some scientists who were involved in constructing one of the global temperature records and were involved in certain sections of IPCC AR4; (2) alleged and confirmed mistakes or alleged unsupported statements in the IPCC AR4; and (3) some new scientific studies not previously considered as part of the scientific record of the Endangerment Finding. Petitioners claim these pieces of evidence show that the science underlying the Administrator's Endangerment Finding is potentially

⁵ Some petitioners also raise objections to EPA's Endangerment Finding based on legal arguments related to other EPA or National Highway Traffic Safety Administration actions. For the reasons discussed in Section IV of this Decision, those objections also fail to meet the standard for reconsideration and are denied.

⁴ National Research Council (NRC) (2010). *Advancing the Science of Climate Change*. National Academy Press. Washington, DC.

flawed, and that therefore EPA should reopen the process and reconsider the Endangerment Finding. For reasons stated above and throughout this Decision and accompanying RTP document, EPA is denying the request to reconsider the Findings.

As discussed further in sections III and IV of this Decision, some of the objections raised in the petitions fail to demonstrate that it was impracticable to raise the objections during the comment period following the proposed Findings, or that the grounds for the objections arose after the period for judicial review. For all issues and arguments presented by the petitioners, the objections are not of central relevance to the outcome of the Findings, as explained in detail below. Thus, none of the objections meet the criteria for reconsideration under the CAA. EPA is also denying two requests to stay the Findings pending reconsideration.

1. The ICTA Petition and *Massachusetts v. EPA*

a. ICTA Petition

In October 1999, the International Center for Technology Assessment (ICTA) and 18 other organizations filed a petition with EPA, requesting that EPA issue emission standards for emissions of carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons from motor vehicles under CAA section 202(a) (ICTA Petition). The ICTA Petition alleged that emissions of these four greenhouse gases—CO₂, CH₄, N₂O, and HFCs—constituted emissions of “air pollutants” under section 302(g) of the Act, 42 U.S.C. 7602(g). The ICTA Petition further argued that emissions of these gases from motor vehicles fully met the criteria for regulation under CAA section 202(a)(1), 42 U.S.C. 7521(a)(1), and claimed that it would be feasible for EPA to regulate greenhouse gas emissions from mobile sources.

After soliciting and considering approximately 50,000 public comments on the ICTA Petition, see 66 FR 7486, January 23, 2001), the Agency ultimately denied it on several independent grounds. EPA first explained that Congress did not intend in the CAA to provide the Agency with authority to regulate CO₂ and other greenhouse gases to address global climate change (68 FR 52925–29). For a variety of reasons, EPA determined that it was unreasonable to read the Act as providing the Agency with authority to regulate emissions of CO₂ and other greenhouse gases to address global climate change. *Id.* at 52928. Based on this conclusion, the Agency also determined that greenhouse gases could

not be considered air pollutants for purposes of the CAA’s regulatory provisions for any contribution they may make to climate change. *Id.*

The Agency also explained why, even if it had the authority to issue such regulations, it still believed that the ICTA Petition should be denied. To begin with, EPA found that requiring passenger cars and light trucks to emit less CO₂, the predominant greenhouse gas, would be tantamount to imposing more stringent fuel economy standards on those vehicles. *Id.* at 52929. The Agency pointed out, however, that the Energy Policy and Conservation Act (EPCA) authorizes only the Department of Transportation (DOT) to increase the stringency of motor vehicle fuel economy standards, and specifies a detailed regulatory regime that an EPA requirement to significantly reduce motor vehicle CO₂ emissions would unavoidably abrogate. *Id.*; see also 49 U.S.C. 32902 (relevant provision of EPCA).

EPA also disagreed with the petitioners’ view that, assuming the Act gives EPA authority to regulate CO₂ and other greenhouse gases to address global climate change, the Agency had already made statements that triggered a mandatory duty to issue motor vehicle standards for CO₂ and other greenhouse gases (68 FR 52929, September 8, 2003). After summarizing the findings of a 2001 report on global climate change by the National Academy of Sciences (NAS), the Agency concluded that “[u]ntil more is understood about the causes, extent and significance of climate change and the potential options for addressing it, EPA believes it is inappropriate to regulate [greenhouse gas] emissions from motor vehicles.” *Id.* at 52,931.

b. *Massachusetts v. EPA*

EPA’s initial denial of the ICTA petition (68 FR 52922, September 8, 2003) was the basis for the U.S. Supreme Court’s decision in *Massachusetts v. EPA*, 549 U.S. 497 (2007). In *Massachusetts v. EPA*, the Supreme Court held that EPA had improperly denied the petition. The Court held that greenhouse gases meet the definition of air pollutant in the CAA, and that the grounds EPA gave for denying the petition were “divorced from the statutory text” and hence improper. Specifically, the Court held that carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons fit the CAA’s “sweeping definition of ‘air pollutant’” since they are “without a doubt ‘physical [and] chemical * * * substances which [are] emitted into * * * the ambient air.’ The statute is

unambiguous.” *Id.* at 529. The Court also rejected the argument that EPA could not regulate motor vehicle emissions of the chief greenhouse gas, carbon dioxide, because doing so would essentially require control of vehicle fuel economy, and Congress delegated that authority to the Department of Transportation in the Energy Policy and Conservation Act. The Court held that the fact “that DOT sets mileage standards in no way licenses EPA to shirk its environmental responsibilities. EPA has been charged with protecting the public’s ‘health’ and ‘welfare,’ 42 U.S.C. 7521(a)(1), a statutory obligation wholly independent of DOT’s mandate to promote energy efficiency.” *Id.* at 532 (citation omitted). The two obligations may overlap “but there is no reason to think the two agencies cannot both administer their obligations and yet avoid inconsistency.” *Id.*

Turning to EPA’s alternative grounds for denial, the Court held that EPA’s decision on whether or not to grant the petition must relate to “whether an air pollutant ‘causes, or contributes to, air pollution which may reasonably be anticipated to endanger public health or welfare.’” *Id.* at 532–33. Thus, “[u]nder the clear terms of the Clean Air Act, EPA can avoid taking further action only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do.” *Id.* at 533. The Court held that three of the four reasons EPA advanced as alternative grounds for denying the petition were unrelated to whether greenhouse gas emissions from new motor vehicles cause or contribute to air pollution that may reasonably be anticipated to endanger public health or welfare. Thus, EPA had failed to offer a reasoned explanation for its action. The Court further held that EPA’s generalized concerns about scientific uncertainty were likewise insufficient unless “the scientific uncertainty is so profound that it precludes EPA from making a reasoned judgment as to whether greenhouse gases contribute to global warming,” in which case EPA must so find. *Id.* at 534.

The Supreme Court was careful to note that it was not dictating EPA’s action on remand, and was not deciding whether or not EPA must find that greenhouse gases endanger public health or welfare. Nor did the Court rule on “whether policy concerns can inform EPA’s actions in the event that it makes such a finding.” *Id.* at 534–35. The Court also observed that under CAA section 202(a), “EPA no doubt has significant latitude as to the manner, timing,

content, and coordination of its regulations with those of other agencies.” *Id.* at 533. Nonetheless, any EPA decisions concerning the endangerment and cause or contribute criteria must be grounded in the requirements of CAA section 202(a).

On September 17, 2007, EPA’s denial of the ICTA petition was vacated and remanded to EPA for further proceedings consistent with the Supreme Court’s opinion.

2. *Post-Massachusetts v. EPA*

In response to a May 2007 Executive Order (EO 13432) and instructions from then-President Bush, EPA began working closely with the Departments of Transportation, Energy and Agriculture to develop, under the CAA, proposals for greenhouse gas standards for motor vehicles and renewable and alternative fuel requirements for gasoline.

However, after enactment of the Energy Independence and Security Act of 2007 (EISA) in late December 2007, work in response to the Supreme Court’s decision shifted. Rather than moving forward with the proposed endangerment determination and attendant greenhouse gas vehicle standards under the CAA, EPA developed an Advance Notice of Proposed Rulemaking (ANPR) on “Regulating Greenhouse Gas Emissions under the Clean Air Act,” which was published on July 30, 2008 (73 FR 44354). The ANPR presented information relevant to, and solicited public comment on, a wide variety of issues regarding the potential regulation of greenhouse gases under the CAA, including EPA’s response to the Supreme Court’s decision in *Massachusetts v. EPA*. Section V of the ANPR contained an earlier version of much of the material in the Findings, including the legal framework, a summary of the science of climate change, and an illustration of how the Administrator could analyze the cause or contribute element using information regarding the greenhouse gas emissions of the portion of the U.S. transportation sector covered by CAA section 202(a). A July 2008 version of the TSD for the endangerment finding was also in the docket for the ANPR (EPA–HQ–OAR–2008–0318).

The comment period for the ANPR was 120 days, and it provided an opportunity for EPA to hear from the public with regard to the issues involved in endangerment and cause or contribute findings, as well as the supporting science. EPA received, reviewed, and considered numerous comments at that time and this public input was reflected in the Findings that

the Administrator proposed in April 2009. In addition, many comments were received on the TSD released with the ANPR. These comments are reflected in revisions to the TSD that was released in April 2009 to accompany the Administrator’s proposal.

3. Proposed and Final Endangerment and Cause or Contribute Findings

In April 2009, the Administrator proposed to find under CAA section 202(a) that the mix of six key greenhouse gases in the atmosphere may reasonably be anticipated to endanger public health and welfare. Specifically, the Administrator proposed to define the “air pollution” referred to in CAA section 202(a) to be the mix of six key directly emitted and long-lived greenhouse gases: Carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (74 FR 18886, April 24, 2009). The Administrator further proposed to find that combined greenhouse gas emissions from new motor vehicles and new motor vehicle engines contribute to this air pollution that endangers public health and welfare.

The Administrator’s proposal was subject to a 60-day public comment period, which ended June 23, 2009, and also included two public hearings. Over 380,000 public comments were received on the Administrator’s proposed endangerment and cause or contribute findings, including comments on the elements of the Administrator’s April 2009 proposal, the legal issues pertaining to the Administrator’s decisions, and the underlying TSD containing the scientific and technical information.

After carefully reviewing the public comments and all the information before her, on December 7, 2009, the Administrator signed the final Findings (74 FR 66496, December 15, 2009). Specifically, she found under CAA section 202(a) that atmospheric concentrations of the six greenhouse gases taken in combination may reasonably be anticipated to endanger both the public health and the public welfare of current and future generations. The Administrator also found that the combined emissions of these greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas air pollution that endangers public health and welfare under CAA section 202(a).

The July 2008 ANPR and the April 2009 proposed Findings were accompanied by draft versions of the TSD and the Findings were supported by the final TSD. The TSD provided an

overview of all the major scientific assessments available at the time of each action, and greenhouse gas emission inventory data relevant to the contribution finding. Each of these three versions of the TSD were subject to review by Federal climate experts to ensure that they represented an accurate summary of the major scientific assessments. Moreover, the July 2008 and the April 2009 versions of the TSD were subject to public review as part of the public comment periods for the ANPR and proposed Findings.

4. Petitions for Reconsideration and Stay Requests

Between December 2009 and March 2010, EPA received 10 petitions (and supplements thereto) to reconsider the Findings.⁶ Nine of these petitions base their requests on allegations that developments since the close of the comment period on the proposed Findings call into question the science underlying the Findings. One petition focuses on statements since the close of the comment period regarding the impact of regulating stationary sources under the CAA, and the relationship between EPA’s proposed Light-Duty Vehicle Rule (see below) and the National Highway Transportation Safety Administration’s (NHTSA) proposed Corporate Average Fuel Economy (CAFE) rule as a basis for their request that EPA reconsider the Findings. Each significant objection in the petitions is discussed in detail below and the accompanying RTP document. Note that when more than one petitioner raised an objection, our response to that objection is provided only once.

In addition, EPA received two requests to administratively stay the final Findings. One administrative stay request under CAA section 307(d)(7)(b) was tied to a petition to reconsider the findings based on concerns about the science and requested that EPA stay the final Findings for three months. The other administrative stay request was filed under CAA section 307(d)(7)(B), the Administrative Procedures Act (APA) section 705, and Federal Rule of Appellate Procedure 18(a)(1) as part of the petition for reconsideration relating to stationary source concerns, and requested a stay pending EPA’s completion of its reconsideration of the final Findings.

II. Standard for Reconsideration

Section 307(d)(7)(B) of the CAA strictly limits petitions for

⁶ The West Virginia Coal Association also filed a letter in support of the existing petitions for reconsideration.

reconsideration both in time and scope. It states that: "Only an objection to a rule or procedure which was raised with reasonable specificity during the period for public comment (including any public hearing) may be raised during judicial review. If the person raising an objection can demonstrate to the Administrator that it was impracticable to raise such objection within such time or if the grounds for such objection arose after the period for public comment (but within the time specified for judicial review) and if such objection is of central relevance to the outcome of the rule, the Administrator shall convene a proceeding for reconsideration of the rule and provide the same procedural rights as would have been afforded had the information been available at the time the rule was proposed. If the Administrator refuses to convene such a proceeding, such person may seek review of such refusal in the United States court of appeals for the appropriate circuit (as provided in subsection (b)). Such reconsideration shall not postpone the effectiveness of the rule. The effectiveness of the rule may be stayed during such reconsideration, however, by the Administrator or the court for a period not to exceed three months."

Thus the requirement to convene a proceeding to reconsider a rule is based on the petitioner demonstrating to EPA: (1) That it was impracticable to raise the objection during the comment period, or that the grounds for such objection arose after the comment period but within the time specified for judicial review (i.e., within 60 days after publication of the final rulemaking notice in the **Federal Register**, see CAA section 307(b)(1); and (2) that the objection is of central relevance to the outcome of the rule.

As to the first procedural criterion for reconsideration, a petitioner must show why the issue could not have been presented during the comment period, either because it was impracticable to raise the issue during that time or because the grounds for the issue arose after the period for public comment (but within 60 days of publication of the final action). Thus, CAA section 307(d)(7)(B) does not provide a forum to request EPA to reconsider issues that actually were raised, or could have been raised, prior to promulgation of the final rule.

In EPA's view, an objection is of central relevance to the outcome of the rule only if it provides substantial support for the argument that the regulation should be revised. See Denial of Petition to Reconsider, 68 FR 63021 (November 7, 2003), Technical Support Document for Prevention of Significant

Deterioration (PSD) and Nonattainment New Source Review (NSR): Reconsideration at 5 (Oct. 30, 2003) (EPA-456/R-03-005) (available at <http://www.epa.gov/nsr/documents/petitionresponses10-30-03.pdf>); Denial of Petition to Reconsider NAAQS for PM, 53 FR 52698, 52700 (December 29, 1988), citing Denial of Petition to Revise NSPS for Stationary Gas Turbines, 45 FR 81653-54 (December 11, 1980), and decisions cited therein.

This interpretation is clearly appropriate in light of the criteria adopted by Congress in this and other provisions in section 307(d). Section 307(d)(4)(B)(i) provides that "[a]ll documents which become available after the proposed rule has been published and which the Administrator determines are of central relevance to the rulemaking shall be placed in the docket as soon as possible after their availability." This provision draws a distinction between comments and other information submitted during the comment period, and other documents which become available after publication of the proposed rule. The former are docketed irrespective of their relevance or merit, while the latter must be docketed only if a higher hurdle of central relevance to the rulemaking is met. Congress also used the phrase "central relevance" in sections 307(d)(7)(B) and (d)(8), and in both cases Congress set a more stringent hurdle than in section 307(d)(4). Under section 307(d)(7)(B), the Administrator is required to reconsider a rule only if the objection is "of central relevance to the outcome of the rule." Likewise, section 307(d)(8) authorizes a court to invalidate a rule for procedural errors only if the errors were "so serious and related to matters of such central relevance to the rule that there is a substantial likelihood that the rule would have been substantially changed if such errors had not been made." In both of these provisions, it is not enough that the objection or error be of central relevance to the issues involved in the rulemaking, as in section 307(d)(4). Instead, the objection has to be of central relevance "to the outcome of the rule" itself, and the procedural error has to be of such central relevance that it presents a "substantial likelihood that the rule would have been substantially changed." Central relevance to the issues involved in the rulemaking is not enough to meet the criteria Congress set under sections 307(d)(7) or (d)(8). Both of those provisions require that the objection or error be central to the substantive decision that is the outcome of the

rulemaking. This difference is significant, and indicates that Congress set a much higher hurdle for disturbing a final rule that has already been issued, as compared to the less stringent criteria for docketing of documents before a decision has been made and a rule has been issued.

In this context, EPA's interpretation of section 307(d)(7)(B) gives full and appropriate meaning to the criteria adopted by Congress. An objection is considered of central relevance to the outcome of the rule only if it provides substantial support for the argument that the regulation should be revised. This properly links the criteria to the outcome of the rulemaking, not just the issues in the rulemaking. It requires that the objection be of such substance and merit that it can be considered central to the outcome of the rulemaking. This interpretation is consistent with section 307(d)(8), which also ties central relevance to the outcome of the rulemaking, in terms of a "substantial likelihood" that the rule would be "substantially changed." This interpretation gives proper weight to the approach throughout section 307(b) and (d) of the importance Congress attributed to preserving the finality of agency rulemaking decisions. This interpretation is also consistent with the case law, as discussed below.

As discussed in this Decision, EPA is denying the petitions because they fail to meet these criteria. In many cases, the objections raised in the petitions to reconsider were or could have been raised during the comment period of the proposed Findings. In all cases, the objections are not of central relevance to the outcome of the rule because they do not provide substantial support for the argument that the Endangerment Finding should be revised.

Pacific Legal Foundation (PLF) argues that its objections are of central relevance because the CRU documents and e-mails "cast substantial uncertainty over" the final Endangerment Finding, and that EPA is required to grant the petition or reconsider "if information not available in the rulemaking record for public comment casts substantial uncertainty over the final regulation." PLF Pet at 8-9. They argue that this is the case even if one does not assume or even argue that the statements in the CRU documents and e-mails are true. PLF Pet. at 6. They base this claim on *Kennecott Corp. v. EPA*, 684 F.2d 1007, 1017-20 (DC Cir. 1982).

PLF's view of *Kennecott* fails to account for the specific procedural issues that were central to that case. In *Kennecott*, petitioners objected that EPA had not provided adequate notice and

an opportunity for comment in the underlying rulemaking, in violation of various CAA section 307(d) provisions. Petitioners had two different notice and comment objections. First, they objected to EPA's failure to include certain documents in the docket at the time of the proposal, including various EPA financial analyses performed prior to the proposal. The court found that these documents were part of the basis for the proposed regulations and needed to be docketed so comment could be taken on them during the comment period. The court found that the failure to submit these documents to the docket at the time of the proposal was a procedural violation of CAA section 307(d)'s notice and comment requirements, because the documents EPA failed to docket made impossible any meaningful comment on the merits of EPA's proposal. The missing documents led to uncertainty over EPA's basis for the proposal, which the documents could clarify. This procedural violation met the test under CAA section 307(d)(9) for reversible error, because it indicated a "substantial likelihood" that the regulations would "have been significantly changed." *Kennecott*, 684 F.2d at 1018-1019.⁷

Petitioners in *Kennecott* also objected to EPA's submission to the docket, one week prior to promulgation of the final rule, of certain economic forecast data upon which EPA relied for the final rule, where the forecast data differed significantly from the forecast data provided during the public comment period. The court found that this late submission of important information relied on by EPA, without an opportunity to comment, also violated the notice and comment requirements of CAA section 307(d). *Id.* at 1019.

Given these two violations of the notice and comment requirements of CAA section 307(d), the court determined that consideration of a petition to reconsider after promulgation of the final rule was not an adequate substitute for the statutory required notice and opportunity to comment prior to promulgation of the rule. EPA failed to provide adequate notice and an opportunity to comment during the rulemaking process, and could not cure that by later considering the merits of the petitioner's comments post-promulgation, through a petition to reconsider, where the issues involved

⁷ It is this discussion of uncertainty that is cited by PLF. However this concerns the criteria for reversible error under CAA section 307(d)(9)(D)(iii) for a procedural violation. The court did not address this as the test for CAA section 307(d)(7)(B), and certainly did not do so for cases where there is no procedural violation.

were critical to the central issues involved in the rule. *Id.* at 1019.

EPA's failure to provide adequate notice and an opportunity to comment in violation of CAA section 307(d) was the critical underpinning for the court's determination that in that case consideration of the merits of the objections through a post-promulgation petition to reconsider was not an adequate substitute for providing the required procedural rights prior to promulgation. That, however, is not the case here. Petitioners are not claiming that the CRU e-mails or other documents show that EPA failed to provide adequate notice and an opportunity to comment because EPA failed to docket any documents or EPA docketed late any documents used to support EPA's final Endangerment Finding. Instead, petitioners are claiming that EPA should reopen the rulemaking and reconsider the Endangerment Finding based on new documents and arguments that petitioners bring to EPA, which they claim undermine the basis for EPA's Endangerment Finding.⁸ There is no basis for treating the court's decision in *Kennecott* as precedent here, where there is no comparable procedural notice and comment violation by EPA. There is no reason to limit EPA's ability to consider the merits of the petitioners' objections through a post-promulgation petition to reconsider, whereas in this case there is no violation of a statutory right to notice and comment and EPA's consideration of the merits of the petitioners' objections is not being used as an improper substitute or cure for an EPA failure to provide adequate notice and an opportunity to comment prior to promulgation of the final rule. Unlike the situation in *Kennecott*, EPA's consideration of the petitions to reconsider is focused on whether the claimed new evidence and arguments warrant a reopening of a prior, properly noticed rulemaking. Absent a demonstration that the objections raised by petitioners provide substantial support for the argument that the regulation should be revised, such

⁸ Southeastern Legal Foundation, Inc. (SLF) inappropriately points to the docketing requirements under CAA section 307(d)(3) related to a proposed rule, SLF at 3-5. However, the documents SLF refers to are not EPA documents, were not part of the basis for EPA's proposal, and arose after the comment period, not prior to proposal. The provisions for a petition to reconsider under CAA section 307(d)(7), not the provisions of CAA section 307(d)(3), apply to the concerns raised by SLF with respect to the arguments and documents submitted to the agency after the end of the comment period, in the petitions to reconsider.

reopening is not warranted. Nothing in *Kennecott* holds otherwise.

Appalachian Power Company et al. v. EPA, 249 F.3d 1032 (D.C. Cir. 2001) clearly supports this view. In that case, petitioners presented comments to EPA requesting that EPA consider various materials concerning the issue of substantial contribution under section 126. Because EPA had already promulgated a rule that addressed the issue of significant contribution, EPA properly treated the request as a petition to reconsider the prior rule. EPA evaluated the evidence and its relevance to the section 126 rule and for a variety of reasons rejected it on the merits as a basis for reopening the rule. The court upheld EPA's decision, stating that "[g]iven the deferential standard employed in this context, the EPA's refusal to reopen and reconsider its significant contribution findings must be upheld." *Id.* at 1060.

Part III of this Decision explains why EPA is denying the petitions with respect to the objections set forth in these petitions for reconsideration. With respect to some of these issues, the petitioners clearly have not met the procedural predicate for reconsideration. That is, the petitioners have not demonstrated that it was impracticable to raise these objections during the comment period, or that the grounds for these objections arose after the close of the comment period but within 60 days after publication of the final rule. As such, they do not meet the statutory criteria for administrative reconsideration under CAA section 307(d)(7)(B).⁹ For all of the objections, whether or not the petitions might be considered to meet the procedural criterion for reconsideration, the petitioners' objections and arguments in terms of substance are not "of central relevance" to the outcome of the rulemaking. Thus, none of the objections meet the criteria for reconsideration under the CAA.

As noted in Section I.B.4 of this Decision, EPA also received two requests to administratively stay the final Findings. Two petitioners requested an administrative stay under

⁹ The Chamber of Commerce's petition was based on grounds that it claims arose after the time period for seeking judicial review of the underlying rulemaking. The Chamber argues that EPA should grant reconsideration in its discretion, even if it is not required to do so under section 307(d). The failure of the Chamber to file timely objections or to demonstrate that the objections it raises provide substantial support for the argument that the regulation should be revised are a fully adequate basis for EPA to deny the Chamber's petition. In any case, even if the petition were timely, EPA has considered the objections raised by the Chamber and is denying their petition as discussed in more detail herein.

CAA section 307(d)(7)(B), tied to the petitions to reconsider the findings, requesting that EPA stay the Findings for three months. Southeastern Legal Foundation at 8, Chamber of Commerce at 1. EPA has authority to issue a stay for up to 3 months if it grants a petition to reconsider under CAA section 307(d)(7)(B). As described below, EPA is denying the petitions to reconsider, hence there is no basis for issuance of an administrative stay under this provision.

One of the administrative stay requests was filed under section 705 of the Administrative Procedure Act (APA) as part of the petition for reconsideration relating to stationary source concerns, and requested a stay pending EPA's completion of its reconsideration of the final Findings. Chamber at 23–34. 5 U.S.C. 705 authorizes an agency to postpone the effective date of an agency action pending judicial review when the agency finds that justice so requires. In this case, the Endangerment Finding was effective as of January 14, 2010. The request for an administrative stay was submitted by petition dated March 15, 2010, after the Endangerment Finding was effective. Even if EPA believed that an administrative stay was warranted, which it does not, it is not clear whether EPA would have the authority under APA section 705 to stay an agency action that has already gone into effect. Postponing an effective date implies acting before the effective date occurs.

In any case, an administrative stay of the Endangerment Finding is not warranted. In response to the arguments raised by the Chamber, (1) the Chamber has not made a strong showing on the merits, for all of the reasons upon which EPA is denying the petitions to reconsider; (2) the Chamber's arguments concerning irreparable harm fail to adequately account for the proposed or recently issued Final Prevention of Significant Deterioration (PSD) and Title V Greenhouse Gas Tailoring Rule (75 FR 31518, 31579–84; June 3, 2010) (Final Tailoring Rule), and present general, unspecific, and unsupported arguments; (3) the Chamber's arguments that EPA's standards for emissions of GHGs from light-duty vehicles would have no important benefit because of the related NHTSA CAFE rule are rejected for the reasons discussed in Section IV.B of this Notice, and (4) the Chamber's arguments concerning the public interest, which repeat its prior arguments, are rejected for the same reasons.

III. Science Related Issues

A. General Summary of Petitioners' Arguments

The petitioners generally claim that the science underlying the Administrator's Endangerment Finding is flawed and/or that EPA did not follow an appropriate or robust process in evaluating the underlying science for purposes of making an endangerment finding for greenhouse gases. Many of the 10 petitions present similar arguments. Some of the petitioners' arguments were raised during the 60-day public comment period following the proposed Findings (74 FR 18886, April 24, 2009).

Many of the petitioners critique specific elements of the underlying science that support the Findings, primarily the HadCRUT temperature record showing increases in global surface temperatures. There are many elements of the underlying science that support the Administrator's Endangerment Finding that are not addressed by the petitioners. Petitioners assert that the global temperature record is so central to all greenhouse gas and climate change science that the problems with a global surface temperature record essentially mean all scientific knowledge linking greenhouse gases and climate change, and by extension all public health and welfare risks associated with human-induced climate change, must also be called into question. Petitioners also question the credibility of the IPCC and, by extension, EPA's use of IPCC AR4 as a significant reference document supporting the Findings.

The primary information provided by the petitioners to back their arguments are:

(1) A set of disclosed private e-mail communications among some scientists associated with the HadCRUT temperature record and associated with certain sections of IPCC AR4.

(2) A small number of factual mistakes and claimed factual mistakes and alleged unsupported statements in the voluminous, 2,927-page IPCC AR4.

(3) A limited number of new studies for EPA to consider.

EPA's responses to the petitioners' evidence, arguments, and claims are summarized in this section of this Decision and provided in fuller technical detail in the accompanying three-volume RTP document. More specifically, the petitioners' arguments can generally be grouped into three broad categories:

- Climate science and data issues, including (1) the validity of the reconstructed surface temperature

record from the distant past and whether or not recent observations of global warming are unusual; (2) the validity of the more recent surface temperature record and whether recent temperature changes can be attributed to human emissions of greenhouse gases; (3) the validity of the HadCRUT surface temperature record of the Climatic Research Unit (CRU); (4) the validity of the recent surface temperature records constructed by the National Oceanographic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA); and (5) the implications of new studies not previously considered.

- Issues raised by EPA's use of IPCC reports, including: (1) Claims that recently found errors and claimed errors in IPCC AR4 undermine IPCC's credibility and therefore EPA's use of IPCC AR4 as a primary reference document; and (2) claims that IPCC has a policy agenda and is not an objective scientific body.

- Process and other issues, including claims that: (1) The USGCRP and the NRC are not separate and independent assessments from IPCC; (2) EPA's process to develop the scientific support for the Findings was inappropriate; (3) there are improper peer-review processes in the underlying scientific literature used by the major assessments; and (4) certain scientists did not adhere to UK and U.S. Freedom of Information Act Requests.

B. Summary of the Science Underlying the Administrator's Endangerment Finding in Light of the Petitioners' Claims

Before addressing the petitioners' general and specific assertions, this section briefly describes the major scientific conclusions and data that support the Administrator's Endangerment Finding that elevated atmospheric concentrations of the group of six key greenhouse gases are reasonably anticipated to endanger the public health and public welfare of current and future generations. As noted above, the petitioners do not take issue with the large body of scientific evidence. Rather, they focus most of their attention on questioning the validity of the global surface temperature record—specifically the HadCRUT temperature record, one of the three major global surface temperature records used by climate researchers—which show that temperatures are increasing. This section puts the global temperature record in the broader context of greenhouse gas and climate change

science, and demonstrates the limited scope of the petitioners' arguments.

There is a causal chain linking atmospheric concentrations of greenhouse gases to impacts and risks to public health and welfare. The elements of this causal chain are:

- What effects do greenhouse gases have on the environment and on climate in particular?
- Are human activities changing the amount of greenhouse gases in our atmosphere?
- What is the evidence indicating that average temperatures are increasing and that climate change is occurring, consistent with the direction one would expect from increasing greenhouse gases in our atmosphere?
- What is the evidence linking observed temperature changes and climate change to the anthropogenic increase in greenhouse gases?
- How are public health and welfare threatened by these changes to climate and the environment, now and in the future?

Each element of the causal chain is discussed below. Evidence related to each element is based on the underlying scientific assessments (e.g., IPCC and USGCRP) that EPA relied on to develop the TSD to support the Administrator's Endangerment Finding, and, where noted, is also based on the most recent scientific assessment, published in May 2010, of the NRC.¹⁰

1. What effects do greenhouse gases have on the environment and on climate in particular?

The physical effect of greenhouse gases on climate and the environment remains a basic scientific fact—greenhouse gases slow the loss of Earth's heat, which would otherwise escape to space. Much like a blanket keeps a person warm by preventing heat loss, greenhouse gases blanket the planet and warm the Earth by trapping in heat that would otherwise escape to space. This is the Earth's natural greenhouse effect. An increase in the amount of greenhouse gases in our atmosphere intensifies the natural greenhouse effect and thus exerts a warming effect on the global climate. These are well-established physical properties of greenhouse gases. The six greenhouse gases grouped together in the Administrator's Endangerment Finding are long-lived in the atmosphere and, once emitted, can remain in the atmosphere for decades to

centuries. Carbon dioxide has other non-climate effects as well. Increases in atmospheric carbon dioxide concentrations can affect oceanic acidity and the growth rates of crops, weeds, and trees. Petitioners have not presented information challenging the basic physical properties of how the six greenhouse gases affect the climate and the environment.

2. How are human activities changing the amount of greenhouse gases in our atmosphere?

It is a well-documented and straightforward observation that levels of carbon dioxide and other greenhouse gases are increasing in our atmosphere. The six key greenhouse gases included in the Administrator's Findings are at essentially unprecedented levels compared to the recent and distant past. Their concentrations are climbing, and this is projected to continue well into this century. The two most important directly emitted greenhouse gases, carbon dioxide and methane, are well above the natural range of atmospheric concentrations compared to at least the last 650,000 years (see TSD EPA-HQ-OAR-2009-0171-11645). The most recent report of the NRC states that carbon dioxide levels are now at 388 parts per million and increasing by almost two parts per million per year.

The fact that greenhouse concentrations are now at such high levels is absolutely central to the Administrator's Endangerment Finding. Without such a large and ever-increasing buildup of atmospheric levels of greenhouse gases there would be less concern about the potential future warming caused by human activities. Greenhouse gases are at such high levels in our atmosphere and continue to climb because human activities are adding greenhouse gases to the atmosphere in larger quantities and more quickly than the environment can handle. Our annual emissions from fossil fuel combustion, deforestation, and other sources are overwhelming the natural removal systems in the ocean, atmosphere, and terrestrial biosphere (e.g., trees and other vegetation).

Furthermore, human activities are unambiguously the driver of the increase in atmospheric levels of greenhouse gases. The EPA TSD states: "The global atmospheric CO₂ concentration has increased about 38% from pre-industrial levels to 2009, and almost all of the increase is due to anthropogenic emissions." This is supported by the most recent NRC report, which states that, "We know that this increase is largely the result of human activities because the chemical

signature of excess CO₂ in the atmosphere can be linked to the composition of the CO₂ emissions from fossil fuel burning. Moreover, analyses of bubbles trapped in ice cores from Greenland and Antarctica reveal that atmospheric CO₂ levels have been rising steadily since the start of the Industrial Revolution." Petitioners do not provide any evidence that cause EPA to question this scientific conclusion.

3. What is the evidence indicating that average temperatures are increasing and climate change is occurring consistent with the direction one would expect with increasing greenhouse gases in our atmosphere?

The scientific literature is clear that the heating effect caused by the buildup of greenhouse gases is warming the climate system. As summarized in the TSD:

- The global average net effect of the increase in atmospheric GHG concentrations, plus other human activities (e.g., land-use change and aerosol emissions), on the global energy balance since 1750 has been one of warming. This total net heating effect, referred to as forcing, is estimated to be +1.6 (+0.6 to +2.4) watts per square meter (W/m²), with much of the range surrounding this estimate due to uncertainties about the cooling and warming effects of aerosols.
- Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level. Global mean surface temperatures have risen by 1.3 ± 0.32 °F (0.74 °C ± 0.18 °C) over the last 100 years. Eight of the 10 warmest years on record have occurred since 2001. Global mean surface temperature was higher during the last few decades of the 20th century than during any comparable period during the preceding four centuries.
- U.S. temperatures also warmed during the 20th and into the 21st century; temperatures are now approximately 1.3 °F (0.7 °C) warmer than at the start of the 20th century, with an increased rate of warming over the past 30 years. Both the IPCC and the USGCRP¹¹ reports attributed recent North American warming to elevated GHG concentrations. In the U.S. Climate Change Science Program (CCSP) (2008)¹² report, the authors find that for

¹⁰ National Research Council (2010) *Advancing the Science of Climate Change: America's Climate Choices*, National Academies Press, Washington, DC.

¹¹ USGCRP now encompasses the former Climate Change Science Program (CCSP) under the previous Administration.

¹² CCSP (2008). *Reanalysis of Historical Climate Data for Key Atmospheric Features: Implications for Attribution of Causes of Observed Change*. A Report

North America, “more than half of this warming [for the period 1951–2006] is likely the result of human-caused GHG forcing of climate change.”

- Widespread changes in extreme temperatures have been observed in the last 50 years across all world regions, including the United States. Cold days, cold nights, and frost have become less frequent, while hot days, hot nights, and heat waves have become more frequent.

- There is strong evidence that global sea level gradually rose in the 20th century and is currently rising at an increased rate.

- Satellite data since 1979 show that annual average Arctic sea ice extent has shrunk by 4.1% per decade.

- Observational evidence from all continents and most oceans shows that many natural systems are being affected by regional climate change, particularly temperature increases.

- Observations show that climate change is currently affecting U.S. physical and biological systems in significant ways.

- Ocean CO₂ uptake has lowered the average ocean pH (increased acidity) level by approximately 0.1 since 1750.

These conclusions are consistent with, or strengthened by, the most recent NRC report which states the following: “Earth is warming. Detailed observations of surface temperature assembled and analyzed by several different research groups show that the planet’s average surface temperature was 1.4 °F (0.8 °C) warmer during the first decade of the 21st century than during the first decade of the 20th century, with the most pronounced warming over the last three decades. These data are corroborated by a variety of independent observations that indicate warming in other parts of the Earth system, including the cryosphere (snow and ice covered regions), the lower atmosphere, and the oceans.”

These multiple lines of evidence highlight a number of things. First, there is well-documented evidence that the buildup of greenhouse gases in our atmosphere is exerting, as expected, a significant heating effect called radiative forcing. This is not to be confused with temperature change or the temperature data that is the subject of many of the petitions. This heating effect or radiative forcing refers to a change in the energy balance of the planet, and is thus the driver of temperature change.

by the U.S. Climate Change Science Program and the Subcommittee on Global Change Research [Randall Dole, Martin Hoerling, and Siegfried Schubert (eds.)]. Asheville, NC: National Oceanic and Atmospheric Administration, National Climatic Data Center. 156 pp.

The magnitude of this heating effect caused by the buildup in atmospheric greenhouse gases has been quantified in the scientific literature. The petitioners do not challenge these estimates and do not challenge the fact that the observed buildup of greenhouse gases is having a clear and quantifiable heating effect on the planet. This is a fundamental pillar of climate change science, and is a fundamental piece of supporting evidence for the Administrator’s Endangerment Finding.

Second, the underlying science indicates that there is significant and unambiguous warming for the Earth and for North America. This is the first place along the causal chain where the petitioners question the science. Many petitioners question the validity of the global temperature evidence by pointing to the CRU e-mails and their impact on the scientific assessment reports used by EPA. This particular critique is addressed below and in fuller detail in Volume 1 of the RTP document.

Third, the evidence of climate change caused by human activities goes beyond average increases in global and continental temperatures. There are well-documented increases in sea level, declines in sea ice, and changes to physical and biological systems, all primarily driven by, and therefore showing further evidence of, increases in average temperatures. These changes are documented by datasets other than temperature datasets, and bear no relation to the particular CRU temperature dataset that is the primary focus of many of the petitioners.

Similarly, the observation that elevated levels of carbon dioxide are increasing the acidity of the world’s oceans is direct evidence of a large-scale and significant environmental effect that does not depend on any evidence from a temperature dataset. This particular effect was considered supporting evidence by the Administrator in the Endangerment Finding. This documented effect is not challenged by any of the petitioners.

4. What is the evidence linking observed temperature changes and climate change to the anthropogenic increase in greenhouse gases?

The underlying science has clearly attributed the observed warming to the buildup of greenhouse gases in our atmosphere. Summarized here is the underlying science that shows that increases in average global and continental temperatures, as well as other climatic changes, can confidently be attributed to the increases in greenhouse gas emissions from human activities. The extent to which observed

warming can be attributed to the human-induced buildup of greenhouse gases in the atmosphere is the second area of the causal chain where some petitioners question the science.

IPCC statements on the linkage between greenhouse gases and temperatures have strengthened since the organization’s early assessments (Solomon et al., 2007).¹³ The IPCC’s *First Assessment Report* in 1990 contained little observational evidence of a detectable anthropogenic influence on climate (IPCC, 1990).¹⁴ In its *Second Assessment Report* in 1995, the IPCC stated that the balance of evidence suggests a discernible human influence on the climate of the 20th century (IPCC, 1996).¹⁵ The *Third Assessment Report* in 2001 concluded that most of the observed warming over the last 50 years is likely to have been due to the increase in greenhouse gas concentrations (IPCC, 2001b).¹⁶ The conclusion in IPCC’s 2007 *Fourth Assessment Report* (2007b)¹⁷ is the strongest yet: “Most of the observed increase in global average temperatures since the mid-20th century is very likely¹⁸ due to the observed increase in anthropogenic GHG concentrations.”

The strength of this statement reflects our current, much better understanding

¹³ Solomon, S., D. Qin, M. Manning, R.B. Alley, T. Berntson, N.L. Bindoff, Z. Chen, A. Chidthaisong, J.M. Gregory, G.C. Hegerl, M. Heimann, B. Hewitson, B.J. Hoskins, F. Joos, J. Jouzel, V. Kattsov, U. Lohmann, T. Matsuno, M. Molina, N. Nicholls, J. Overpeck, G. Raga, V. Ramaswamy, J. Ren, M. Rusticucci, R. Somerville, T.F. Stocker, P. Whetton, R.A. Wood and D. Wratt (2007). Technical Summary. In: *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change* [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor, and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, 996 pp.

¹⁴ IPCC (1990). *First Assessment Report: Climate Change 1990*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

¹⁵ IPCC (1996). *Climate Change 1995: The Science of Climate Change. Intergovernmental Panel on Climate Change [J.T. Houghton, L.G. Meira Filho, B.A. Callander, N. Harris, A. Kattenberg, and K. Maskell (eds.)]*. Cambridge University Press. Cambridge, United Kingdom.

¹⁶ IPCC (2001b). *Summary for Policymakers. In. Climate Change 2001: The Scientific Basis. Contribution of Working Group I to the Third Assessment Report of the Intergovernmental Panel on Climate Change [J.T. Houghton et al. (eds.)]*. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

¹⁷ IPCC (2007b). *Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, Pachauri, R.K. and Reisinger, A. (eds.)]*. IPCC, Geneva, Switzerland, 104 pp.

¹⁸ According to IPCC terminology, “very likely” conveys a 90 to 99% probability of occurrence. See Box 1.2 of the TSD for a full description of IPCC’s uncertainty terms.

of all the factors, not just greenhouse gases, that influence temperature fluctuations and other climatic changes. On this point, EPA's TSD (citing Hegerl *et al.*, 2007)¹⁹ listed the major scientific advances between the Third and Fourth Assessment Reports of the IPCC that led to this increased confidence in the ability to attribute observed temperature and other climate changes to anthropogenic greenhouse gases:

- An expanded and improved range of observations allowing attribution of warming to be more fully addressed jointly with other changes in the climate system.

- Improvements in the simulation of many aspects of present mean climate and its variability on seasonal to inter-decadal time scales.

- More detailed representations of processes related to aerosol and other forcings (i.e., heating and cooling effects) in models.

- Simulations of 20th-century climate change that use many more models and much more complete anthropogenic and natural forcings.

- Multi-model ensembles that increase confidence in attribution results by providing an improved representation of model uncertainty.

Climate model simulations suggest that natural heating factors alone cannot explain the observed warming for the entire globe, the global land, or the global ocean. The observed warming can only be reproduced with models that contain both natural and anthropogenic heating and cooling influences.

EPA's TSD, based on the underlying assessment literature, states that if the additional heating effect of elevated levels of greenhouse gases were the only external influence on the global climate, this likely would have resulted in warming greater than observed. This statement is made because our understanding of the climate system is sophisticated enough to consider and model multiple and simultaneous influences on the global climate. For example, there are known and quantifiable cooling effects from human emissions of aerosols and natural forcings (e.g., volcanic eruptions and solar variability) that have offset some of the greenhouse gas-induced warming during the past half century.

The sophistication of climate models that examine the influence of human

emissions of greenhouse gases has increased. Confidence in these models comes from their foundation in accepted physical principles and from their ability to reproduce observed features of current climate and past climate changes (IPCC, 2007a).²⁰ One petitioner questions the reliability of the models by pointing to certain CRU e-mails. Questions regarding the reliability of climate models are addressed in Volume 4 of the RTC document and in Volume 1 of the RTP document.

Furthermore, warming of the climate system has been detected in changes of surface and atmospheric temperatures, in the upper several hundred meters of the ocean (as evident by the observed increase in ocean heat content), and in contributions to sea level rise. The scientific assessments have established human contributions to all of these changes.

Not only has an anthropogenic warming signal been detected for the surface temperatures, but evidence has also accumulated of an anthropogenic influence throughout different layers of the atmosphere. Some petitioners have raised one potential inconsistency between observed warming and modeled warming higher in the atmosphere over the tropics. Karl *et al.* (2009)²¹ state that when uncertainties in models and observations are properly accounted for, newer observational datasets are in agreement with climate model results. A detailed discussion of this issue is contained in Volume 1, section 1.2 of the RTP document.

Lastly, evidence from climates in the geologic past, going back millions of years, also supports the conclusion that elevated levels of greenhouse gases in the atmosphere are expected to lead to warmer climates. Measurements show that climates from the geologic past have been both warmer and colder than present, and that warmer periods have generally coincided with high atmospheric carbon dioxide levels. Analyses of these paleoclimate data have increased confidence in the role of external influences on climate. Climate models for predicting future climate have been used to reproduce key features of past climates using

conditions and radiative forcing for those periods.

Here too, these conclusions are reinforced by the most recent NRC report, which states:

"Global warming can be attributed to human activities. Many lines of evidence support the conclusion that most of the observed warming since the start of the 20th century, and especially the last several decades, can be attributed to human activities, including the following:

- Earth's surface temperature has clearly risen over the past 100 years, at the same time that human activities have resulted in sharp increases in CO₂ and other GHGs.

- Both the physics of the greenhouse effect and more detailed calculations dictate that increases in atmospheric GHGs should lead to warming of Earth's surface and lower atmosphere.

- The vertical pattern of observed warming—with warming in the bottommost layer of the atmosphere and cooling immediately above—is consistent with warming caused by GHG increases, and inconsistent with other possible causes.

- Detailed simulations with state-of-the-art computer-based models of the climate system are able to reproduce the observed warming trend and patterns only when human-induced GHG emissions are included.

Based on these and other lines of evidence, the Panel on Advancing the Science of Climate Change—along with an overwhelming majority of scientists (Rosenberg *et al.*, 2010)—conclude that much of the observed warming since the start of the 20th century, and most of the warming over the last several decades, can be attributed to human activities" [NRC at 29].

The clear conclusion from all of this evidence is that the human-induced buildup of greenhouse gases in the atmosphere is primarily responsible for most of the observed warming and other climate changes occurring now. The information petitioners present to challenge this part of the scientific record is clearly inadequate.

- Petitioners provide no credible evidence to question the clear observation that greenhouse gases are increasing in our atmosphere to significant levels.

- The petitioners provide no information to question the quantified radiative forcing (heating effect) caused by this greenhouse gas buildup.

- Petitioners' objections about paleoclimate temperature reconstructions focus on one type of reconstruction (tree ring analysis). The objections, addressed in Volume 1 of the RTP document, do not withstand scrutiny, nor do they undermine our confidence in the conclusions of the studies. These conclusions, and the accompanying limitations and uncertainties, have been properly characterized in the assessment reports

¹⁹ Hegerl, G.C., *et al.* (2007). Understanding and Attributing Climate Change. In: Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor, and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

²⁰ IPCC (2007a) Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. [Solomon, S., D. Qin, M. Manning, Z. Chen, M. Marquis, K.B. Averyt, M. Tignor, and H.L. Miller (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

²¹ Karl, T., J. Melillo, and T. Peterson (Eds.) (2009) Global Climate Change Impacts in the United States. Cambridge University Press, Cambridge, United Kingdom.

and the Endangerment Finding. Petitioners do not contest or address the variety of other aspects of paleoclimate research supporting the attribution of recent warming to anthropogenic greenhouse gases.

- With respect to the variety of evidence on observed temperature change, the petitioners focus their criticism on the validity of one of three global surface temperature records, the HadCRUT temperature record. Petitioners' objections are addressed in detail below and in Volume 1 of the RTP document, as are the petitioners' related criticisms of the NOAA and NASA temperature datasets. Their objections do not withstand scrutiny, nor do they reduce our confidence in these temperature records, which have been properly characterized in the assessment reports and the Endangerment Finding. In addition, the petitioners ignore and do not address the clear information and observations showing that other elements of the climate system are undergoing changes consistent with these average temperature increases (e.g., ocean heating, sea level rise, Arctic ice loss). Petitioners do not show that these observations are in error or are the result of some other, unidentified mechanism.

- Petitioners focus their criticism on a possible discrepancy between model predictions and the vertical temperature structure of the atmosphere in the tropics; this criticism is not substantively supported, as discussed below and in Volume 1 of the RTP document.

- The petitioners do not attempt to provide an alternative explanation of the compellingly strong match between the observed magnitude and pattern of warming and the modeled simulations, which include all known factors, including the greenhouse gas buildup, the offsetting cooling influence of aerosols, and variability in solar output.

- Petitioners' arguments that a possible slowdown in the rate of warming over the last 10 years should weaken confidence in the fact that human emissions of greenhouse gases are the primary driver of recent warming are not valid. EPA addresses this issue more fully below and in Volume 1 of the RTP document.

5. How are public health and welfare threatened by these changes to climate and the environment, now and in the future?

The TSD summarizes a number of conclusions from the underlying science on this issue. In addition to documenting many of the key observed changes to atmospheric composition

and climate, such as those outlined above, the TSD summarizes key findings about projected increases in greenhouse gas emissions and the future climate change associated with these future scenarios:

- Most future scenarios that assume no explicit greenhouse gas mitigation actions (beyond those already enacted) project increasing global greenhouse gas emissions over the century, with climbing greenhouse gas concentrations.

- Future warming over the course of the 21st century, even under scenarios of low-emission growth, is very likely to be greater than observed warming over the past century.

- All of the United States is very likely to warm during this century, and most areas of the United States are expected to warm by more than the global average.

- It is very likely that heat waves will become more intense, more frequent, and longer-lasting in a future warm climate, whereas cold episodes are projected to decrease significantly.

- Increases in the amount of precipitation are very likely in higher latitudes, while decreases are likely in most subtropical latitudes and in the southwestern United States, continuing observed patterns.

- Intensity of precipitation events is projected to increase in the United States and other regions of the world.

- It is likely that hurricanes will become more intense, with stronger peak winds and more heavy precipitation associated with ongoing increases of tropical sea surface temperatures. Frequency changes in hurricanes are currently too uncertain for confident projections.

- By the end of the century, global average sea level is projected by the IPCC to rise between 7.1 and 23 inches (18 and 59 centimeter [cm]), relative to around 1990, in the absence of increased dynamic ice sheet loss.

- Sea ice extent is projected to shrink in the Arctic under all IPCC emission scenarios.

The validity of these future climate change projections is not addressed by the petitioners, although some of the petitioners do call into question the climate models that are used to conduct these climate change projections. The petitioners claim that some of the models must be calibrated with the current temperature record, which in turn they assert appears to be flawed. EPA addresses this faulty critique of the models in Volume 1, section 1.2.3 of the RTP document, and had previously addressed similar critiques of climate models in Volume 4 of the RTC document.

It is important to note that none of the petitioners question the conclusion that atmospheric levels of greenhouse gases are expected to continue climbing for the foreseeable future, given the long-lived physical properties of the greenhouse gases themselves and the plausible pathways of human-emitting activities over the next few decades. Climate models aside, it is difficult to imagine a world where the heating effect of climbing greenhouse gas concentrations does not increase for the foreseeable future.

With regard to the impacts and risks to public health and welfare, the TSD and the Administrator's Findings stated the following:

- Severe heat waves are projected to intensify in magnitude and duration over the portions of the United States where these events already occur, with potential increases in mortality and morbidity, especially among the elderly, young, and frail.

- Some reduction in the risk of death related to extreme cold is expected. It is not clear whether reduced mortality from cold will be greater or less than increased heat-related mortality in the United States due to climate change. In addition, the latest USGCRP report refers to a study that analyzed daily mortality and weather data in 50 U.S. cities from 1989 to 2000 and found that, on average, cold snaps in the United States increased death rates by 1.6 percent, while heat waves triggered a 5.7 percent increase in death rates. The study concludes that increases in heat-related mortality due to global warming in the United States are unlikely to be compensated for by decreases in cold-related mortality.

- Increases in regional ozone pollution relative to ozone levels without climate change are expected due to higher temperatures and weaker circulation in the United States and other world cities relative to air quality levels without climate change.

- CCSP concludes that, with increased CO₂ and temperature, the life cycle of grain and oilseed crops will likely progress more rapidly. But, as temperature rises, these crops will increasingly begin to experience failure, especially if climate variability increases and precipitation lessens or becomes more variable.

- Higher temperatures will very likely reduce livestock production during the summer season in some areas, but these losses will very likely be partially offset by warmer temperatures during the winter season.

- Cold-water fisheries will likely be negatively affected; warm-water fisheries will generally benefit; and the

results for cool-water fisheries will be mixed, with gains in the northern and losses in the southern portions of ranges.

- Climate change has very likely increased the size and number of forest fires, insect outbreaks, and tree mortality in the interior West, the Southwest, and Alaska, and will continue to do so.
- Coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution.
- Climate change will likely further constrain already overallocated water resources in some regions of the United States, increasing competition among agricultural, municipal, industrial, and ecological uses.
- Higher water temperatures, increased precipitation intensity, and longer periods of low flows will exacerbate many forms of water pollution, potentially making attainment of water quality goals more difficult.
- Ocean acidification is projected to continue, resulting in the reduced biological production of marine calcifiers, including corals.
- Climate change is likely to affect U.S. energy use and energy production and physical and institutional infrastructures.

Furthermore, the most recent NRC report from 2010 states that: "Global warming is closely associated with a broad spectrum of other climate changes, such as increases in the frequency of intense rainfall, decreases in snow cover and sea ice, more and increasingly intense heat waves, rising sea levels, and widespread ocean acidification. Individually and collectively, and in combination with the effects of other human activities, these changes pose risks for a wide range of human and environmental systems, including freshwater resources, the coastal environment, ecosystems, agriculture, fisheries, human health, and national security, among others."

The petitioners have not raised any objections to EPA's analysis and judgments concerning these risks and impacts to public health and welfare, which were the foundation of the Administrator's Endangerment Finding.

C. Review of the Administrator's Findings

Throughout this Decision, EPA explains why the petitioners' arguments and information fail to show that the scientific underpinnings of the Endangerment Finding are flawed. EPA remains convinced that the underlying science is robust, and that the

Administrator appropriately interpreted the science to make the Endangerment Finding. This section summarizes the Administrator's December 2009 rationale and judgment based on the underlying science.

The Administrator exercised her judgment under CAA section 202(a) by evaluating what the body of scientific evidence indicates with respect to how greenhouse gases affect the climate, and the degree of scientific consensus about the appropriate conclusions to draw from this evidence. Based on this consideration, the Administrator proposed and took comment on her preliminary judgment of endangerment to public health and welfare. The Administrator found the case to be compelling that greenhouse gas air pollution endangers both public health and welfare within the United States. The underlying science that EPA relied on included careful qualifications and characterizations about the degree of certainty regarding the scientific conclusions that were germane to the Administrator's Findings. The Administrator's reasoning and decision-making process to reach the Findings make clear that there was full acknowledgement that certain elements of the science are known with virtual certainty and others are currently more uncertain.

A robust and comprehensive opportunity for comment allowed any and all objections regarding her judgment to be raised. After carefully reviewing the comments, the Administrator confirmed her judgment on endangerment and provided responses to the scientific, legal, and policy issues raised by commenters. The final rule explains in detail the basis for the Administrator's Endangerment Finding. Key elements of the Administrator's justification and decision process are summarized in the following 10 paragraphs from the December 15, 2009 Findings (74 FR 66523–24).

"As described in Section II of these Findings, the endangerment test under CAA section 202(a) does not require the Administrator to identify a bright line, quantitative threshold above which a positive endangerment finding can be made. The statutory language explicitly calls upon the Administrator to use her judgment. This section describes the general approach used by the Administrator in reaching the judgment that a positive endangerment finding should be made, as well as the specific rationale for finding that the greenhouse gas air pollution may reasonably be anticipated to endanger both public health and welfare.

First, the Administrator finds the scientific evidence linking human emissions and

resulting elevated atmospheric concentrations of the six well-mixed greenhouse gases to observed global and regional temperature increases and other climate changes to be sufficiently robust and compelling. This evidence is briefly explained in more detail in Section V of these Findings. The Administrator recognizes that the climate change associated with elevated atmospheric concentrations of carbon dioxide and the other well-mixed greenhouse gases have the potential to affect essentially every aspect of human health, society, and the natural environment.

The Administrator is therefore not limiting her consideration of potential risks and impacts associated with human emissions of greenhouse gases to any one particular element of human health, sector of the economy, region of the country, or to any one particular aspect of the natural environment. Rather, the Administrator is basing her finding on the total weight of scientific evidence, and what the science has to say regarding the nature and potential magnitude of the risks and impacts across all climate-sensitive elements of public health and welfare, now and projected out into the foreseeable future. The Administrator has considered the state of the science on how human emissions and the resulting elevated atmospheric concentrations of well-mixed greenhouse gases may affect each of the major risk categories, i.e., those that are described in the TSD, which include human health, air quality, food production and agriculture, forestry, water resources, sea level rise and coastal areas, the energy sector, infrastructure and settlements, and ecosystems and wildlife. The Administrator understands that the nature and potential severity of impacts can vary across these different elements of public health and welfare, and that they can vary by region, as well as over time.

The Administrator is therefore aware that, because human-induced climate change has the potential to be far-reaching and multi-dimensional, not all risks and potential impacts can be characterized with a uniform level of quantification or understanding, nor can they be characterized with uniform metrics. Given this variety in not only the nature and potential magnitude of risks and impacts, but also in our ability to characterize, quantify and project into the future such impacts, the Administrator must use her judgment to weigh the threat in each of the risk categories, weigh the potential benefits where relevant, and ultimately judge whether these risks and benefits, when viewed in total, are judged to be endangerment to public health and/or welfare.

This has a number of implications for the Administrator's approach in assessing the nature and magnitude of risk and impacts across each of the risk categories. First, the Administrator has not established a specific threshold metric for each category of risk and impacts. Also, the Administrator is not necessarily placing the greatest weight on those risks and impacts, which have been the subject of the most study or quantification.

Part of the variation in risks and impacts is the fact that climbing atmospheric

concentrations of greenhouse gases and associated temperature increases can bring about some potential benefits to public health and welfare in addition to adverse risks. The current understanding of any potential benefits associated with human-induced climate change is described in the TSD and is taken into consideration here. The potential for both adverse and beneficial effects are considered, as well as the relative magnitude of such effects, to the extent that the relative magnitudes can be quantified or characterized. Furthermore, given the multiple ways in which the buildup of atmospheric greenhouse gases can cause effects (e.g., via elevated carbon dioxide concentrations, via temperature increases, via precipitation increases, via sea level rise, and via changes in extreme events), these multiple pathways are considered. For example, elevated carbon dioxide concentrations may be beneficial to crop yields, but changes in temperature and precipitation may be adverse and must also be considered. Likewise, modest temperature increases may have some public health benefits as well as harms, and other pathways such as changes in air quality and extreme events must also be considered.

The Administrator has balanced and weighed the varying risks and effects for each sector. She has judged whether there is a pattern across the sector that supports or does not support an endangerment finding, and if so, whether the support is of more or less weight. In cases where there is both a potential for benefits and risks of harm, the Administrator has balanced these factors by determining whether there appears to be any directional trend in the overall evidence that would support placing more weight on one than the other, taking into consideration all that is known about the likelihood of the various risks and effects and their seriousness. In all of these cases, the judgment is largely qualitative in nature, and is not reducible to precise metrics or quantification.

Regarding the timeframe for the endangerment test, it is the Administrator's view that both current and future conditions must be considered. The Administrator is thus taking the view that the endangerment period of analysis extend from the current time to the next several decades, and in some cases to the end of this century. This consideration is also consistent with the timeframes used in the underlying scientific assessments. The future timeframe under consideration is consistent with the atmospheric lifetime and climate effects of the six well-mixed greenhouse gases, and also with our ability to make reasonable and plausible projections of future conditions.

The Administrator acknowledges that some aspects of climate change science and the projected impacts are more certain than others. Our state of knowledge is strongest for recently observed, large-scale changes. Uncertainty tends to increase in characterizing changes at smaller (regional) scales relative to large (global) scales. Uncertainty also increases as the temporal scales move away from present, either backward, but more importantly, forward in time. Nonetheless, the current state of

knowledge of observed and past climate changes and their causes enables projections of plausible future changes under different scenarios of anthropogenic forcing for a range of spatial and temporal scales.

In some cases, where the level of sensitivity to climate of a particular sector has been extensively studied, future impacts can be quantified whereas in other instances only a qualitative description of a directional change, if that, may be possible. The inherent uncertainty in the direction, magnitude, and/or rate of certain future climate change impacts opens up the possibility that some changes could be more or less severe than expected, and the possibility of unanticipated outcomes. In some cases, low probability, high impact outcomes (i.e., known unknowns) are possibilities but cannot be explicitly assessed."

The Findings show that the Administrator took a measured, balanced and systematic approach in judging the body of scientific evidence for the Endangerment Finding. The Administrator did not take a narrow view of the science, nor consider only those pieces of evidence that would support a positive endangerment finding.

In taking this approach, the Administrator determined that the body of scientific evidence compellingly supports a positive endangerment finding. The major assessments by the USGCRP, IPCC, and the NRC (published before 2010) served as the primary scientific basis supporting the Administrator's endangerment finding. The Administrator reached her determination by considering both observed and projected effects of greenhouse gases in the atmosphere, their effect on climate, and the public health and welfare risks and impacts associated with such climate change. The Administrator's assessment focused on public health and public welfare impacts within the United States. She also examined the evidence with respect to impacts in other world regions, and she concluded that these impacts strengthen the case for endangerment to public health and welfare because impacts in other world regions can in turn adversely affect the United States.

The Administrator considered how elevated concentrations of the well-mixed greenhouse gases and associated climate change affect public health by evaluating the risks associated with changes in air quality, increases in temperatures, changes in extreme weather events, increases in food- and water-borne pathogens, and changes in aeroallergens. The Administrator placed weight on the fact that certain groups, including children, the elderly, and the poor, are most vulnerable to these climate-related health effects.

The Administrator considered how elevated concentrations of the well-mixed greenhouse gases and associated climate change affect public welfare by evaluating numerous and far-ranging risks to food production and agriculture, forestry, water resources, sea level rise and coastal areas, energy, infrastructure, and settlements, and ecosystems and wildlife. For each of these sectors, the evidence provides support for a finding of endangerment to public welfare. The evidence concerning adverse impacts in the areas of water resources and sea level rise and coastal areas provides the clearest and strongest support for an endangerment finding, both for current and future generations. Strong support is also found in the evidence concerning infrastructure and settlements, as well as ecosystems and wildlife. Across the sectors, the potential serious adverse impacts of extreme events, such as wildfires, flooding, drought, and extreme weather conditions, provide strong support for such a finding.

The petitioners have not provided information that would lead EPA to believe that the Administrator's approach, briefly summarized here and explained in full in the December 2009 Findings, was flawed, should have been carried out differently, or should have led to a different conclusion.

D. General Response to the Petitioners' Scientific Arguments in Light of the Full Body of Scientific Evidence

EPA's overarching conclusion is that there is no material or reliable basis to question the validity and credibility of the body of science underlying the Administrator's Endangerment Finding or the Administrator's decision process articulated in the Findings themselves. The large body of scientific evidence and the Administrator's conclusions drawn from this evidence, including the appropriate characterizations as to the degrees of certainty and uncertainty in the underlying science, has not been changed by the arguments presented by the petitioners. While the petitioners largely rely on making broad assertions about the science based on private communications, EPA's focus is on the actual science itself, and the petitioners have not presented a valid basis supporting the view that the credibility or reliability of either the science or the scientific conclusions that petitioners contest have been undermined or changed in any material way.

The petitioners present very little scientific evidence or scientific arguments to support their views. As demonstrated above, they do not rely on an in-depth and comprehensive analysis of the science and make arguments on

that basis. Instead they largely rely on a small number of statements from the CRU e-mails in which certain scientists expressed various thoughts and feelings, such as frustration and disrespect for other scientists, along with strong views on scientific issues and what constitutes good science. From this evidence, the petitioners conclude that the scientists acted together to distort the review and presentation of the body of science, and presented false, inaccurate, or misleading conclusions about what the body of scientific studies tells us about various aspects of climate change.

Petitioners do not argue their case by marshalling and synthesizing the breadth of the body of scientific evidence and demonstrating why it leads to a different conclusion than that presented in the underlying science supporting the Findings. Instead, they largely argue that the state of mind of these scientists and their private remarks must lead to the conclusions drawn by the petitioners. They also conclude, based on a selective reading of the CRU e-mails, that the state of the science must be much more uncertain than how it is characterized in the underlying assessment reports used by EPA and the Endangerment Finding. Other than the conduct of sending e-mails that evidence strong emotions or unprofessional language, the petitioners present almost no evidence of any actual conduct by the scientists that support their conclusion that the science was assessed inaccurately. Most of the conduct that is identified, such as statements about the professional challenges of working as an IPCC lead author or the discussion with a journal editor to delay the paper publication (but not the online publication) of a study, is of no relevance to the evaluation of the science involved in the assessment reports and the EPA rulemaking.

Petitioners' claims of distortion of data, withholding of temperature data, or abuses in data analysis also do not withstand scrutiny. These issues are addressed in fuller detail in volumes 1 and 3 of the RTP document. In addition, some of these issues were raised and addressed by EPA during the public comment period, and thus fail to meet the test in CAA 307(d). Petitioners have shown no evidence that the HadCRUT temperature record based on the underlying raw temperature data was flawed in any way, or that CRU's lack of possession of a small portion of the raw temperature data impedes the ability of other researchers to check the publically available data, or that it changes the scientific validity of the analyses performed by CRU. The

HadCRUT temperature record remains consistent with all of the other evidence of warming, including other surface temperature analyses as well as other evidence of warming, such as satellite data, ocean temperature data, and physical and biological evidence of the effects of warming.

The petitioners ask EPA to reject the comprehensive and well-documented views reflecting a synthesis of the body of scientific evidence produced by the U.S. and the world's climate science community, and instead accept assertions and three profound leaps in logic, based on a very limited discussion of the underlying science. The first leap is that petitioners' objections to the HadCRUT surface temperature record and objections to reconstructions of past global temperatures are correct, and that as a result all other elements of greenhouse gas and climate change science indicating temperatures are increasing and that anthropogenic greenhouse gases are the primary driver should be called into question. The second leap is that some errors found in the IPCC AR4—errors that are both minor and tangential to EPA's Endangerment Finding—mean that any and all information from that report should be called into question. The third is that any other assessment report that relies on or references the IPCC AR4 in any way is also suspect and cannot serve as a foundation for the Endangerment Finding. EPA's review, discussed in the following sections and in fuller detail in the three volumes of the RTP document, plus the latest conclusions of the May 2010 NRC scientific assessment, lead us to the firm conclusion that the petitioners' specific arguments and broad claims must be rejected for their lack of supporting evidence and absence of comprehensive and clear scientific reasoning.

As stated in one of the findings of the Independent Climate Change E-mails Review, "In particular, we did not find any evidence of behaviour that might undermine the conclusions of the IPCC assessments." EPA's review and analysis leads to this same conclusion.

E. Specific Responses to the Claims and Arguments Raised by Petitioners

EPA's responses to the petitioners' specific claims and arguments are summarized here, and provided in more detail in the RTP document. The more general conclusions provided in this Decision, articulated above, are based on EPA's detailed analysis of and responses to the petitioners' issues contained in the RTP document. As stated previously, the science-based objections raised by petitioners fall into

three categories: Climate science and data issues; issues raised by EPA's use of IPCC AR4; and process issues. This section and the three volumes of the RTP document are organized around these three categories.

1. Climate Science and Data Issues Raised by the Petitioners

The climate science and data issues raised by the petitioners include (a) the validity of the temperature record from the distant past and whether or not recent observations of global warming are unusual; (b) the validity of the more recent surface temperature record; (c) the validity of the HadCRUT surface temperature record and other CRU datasets; (d) the validity of the recent surface temperature record as constructed by the National Oceanographic and Atmospheric Administration (NOAA) and National Aeronautics and Space Administration (NASA); and (e) the implications of new studies not previously considered. Each of these issues is addressed in general here and in fuller detail in the Volume 1 of the RTP document.

a. Validity of Paleoclimate Temperature Reconstructions and Attribution of Observed Temperature Trends to Greenhouse Gases

Petitioners raise various claims about the comparisons of current temperatures with historic temperatures of the distant past (called paleoclimate temperature reconstructions). Petitioners use these claims to contest the view that current warming is unusual and argue that EPA should not rely on this evidence to support the statement in the Endangerment Finding that recent warming can be primarily attributed to increased atmospheric concentrations of greenhouse gases caused by human emissions. EPA addresses these claims in Volume 1, section 1.1 of the RTP document, and summarizes the responses here.

As background, surface temperature records based on observation have global coverage over approximately the last 150 years. To determine temperatures in time periods before the instrumental record, climate scientists use indirect methods called "proxies." These indirect methods include examining tree rings, pollen, plankton records in sediment cores, and other proxies such as atomic isotope ratios in corals and other marine organisms. The statistical relationships found between the proxy and regional temperatures over the past 150 years (*i.e.*, the period when the datasets overlap) are then used to extrapolate over the hundreds or thousands of years before instrumental

records. Researchers combine a number of different proxies from around the world to develop their temperature reconstructions of the past. The further back in the past, the fewer proxies that exist and the greater the uncertainty becomes about estimating past temperatures. These reconstructions contribute to our understanding of historical temperatures and variability and enable comparison of present changes to changes in the past. They also allow testing of climate models and our understanding of how the climate system responded to historical conditions. The term “divergence” refers to a certain subset of the tree ring records whose growth in recent decades no longer correlates with (*i.e.*, it “diverges” from) temperature change in recent decades.

Petitioners claim the CRU e-mails provide new reason to highlight this divergence issue as it may undermine the use of historical temperature reconstructions. EPA disagrees, and finds that the CRU e-mails demonstrate that the scientists were well aware of the divergence issue and addressed it appropriately in their research and publications. A cursory examination of this literature and the assessment reports makes clear that the science community has long been aware of the tree ring divergence issue, as well as other issues concerning the certainty of proxy reconstructions. The uncertainties in the proxy reconstructions were fully presented in the assessment literature, and were considered by EPA in making the Endangerment Finding. In fact, during public comment on the proposed Finding, EPA evaluated and responded to these issues (See EPA RTC, Volume 2, comments 2–64 and 2–67). A recent NRC assessment (2006)²² focused specifically on surface temperature reconstructions and it found that divergence is not an issue with all tree ring proxies, much less the many non-tree ring proxies used in the temperature reconstructions. The petitioners cite some studies²³ in support of their views that the divergence issue was hidden and not appropriately acknowledged. These studies do not support the petitioners’ arguments, instead stating that the divergence problem is neither new nor

hidden, that it is actually “widely perceived” and that the “potential consequences [are] discussed (*e.g.*, IPCC, 2007).”

Nonetheless, petitioners allege that a number of the CRU e-mails suggest that these temperature reconstructions were manipulated and that data has been hidden. Several petitioners refer to an e-mail including the phrase “Mike’s Nature trick”, claiming that this quote is evidence of deception. However, this e-mail about how to connect tree ring data and thermometer data was written in 1999, prior to the publication of the IPCC Third Assessment Report from 2001. The e-mail refers to a graph prepared for the front cover of World Meteorological Organization (WMO) report, unrelated to IPCC, published in 2000. This graph and underlying analysis that is being objected to by petitioners has no relevance to the discussion in either IPCC AR4 or EPA’s TSD, and therefore did not enter into the Administrator’s consideration for the Endangerment Finding. The IPCC AR4 and other assessment literature very transparently document, illustrate, and discuss the divergence issue, as did EPA in the TSD and RTC document. See Figure 4.3, TSD. Other quotes provided by the petitioners do not support a claim of “deliberate manipulation” or “artificial adjustments” when considered in context. This issue of historic temperature reconstructions is discussed in detail in Volume 1 of the RTP document. The UK Independent Climate Change E-Mails Review reached a similar conclusion to EPA’s, stating that they “do not find that the way that data derived from tree rings is described and presented in IPCC AR4 and shown in its Figure 6.10 is misleading” and regarding the phenomenon of divergence that they “are satisfied that it is not hidden and that the subject is openly and extensively discussed in the literature, including CRU papers.”

Petitioners also claim that the Medieval Warming Period may have been warmer than present temperatures, undermining the conclusion that greenhouse gases are a primary cause of current warming. Issues involving the Medieval Warming Period were addressed during the public comment period (see Response 2–62 of the RTC document). Petitioners raise this issue again because of their assertion that the CRU e-mails indicate that the current temperature record may be faulty, which to them gives the Medieval Warming Period new significance. In making their case, petitioners cite a temperature reconstruction without tree rings, notably a study that could have been submitted during the public

comment period.²⁴ However, that paper uses an improper methodology, a straight average of 18 proxies, apparently without weighting them to account for geographic distribution or the strength of the data to detect temperature changes. In contrast, another study using a more sophisticated methodology²⁵ found that recent Northern Hemispheric warmth was anomalous regardless of whether tree ring data were included.

Petitioners argue that if the current warming is not “unprecedented,” our ability to attribute the current warming to greenhouse gases is undermined, and that EPA has not provided “compelling” evidence that the current temperatures are unusual compared to the last 1,000 years. Petitioners misstate EPA’s conclusions and overstate the role of this line of evidence. EPA has not claimed that current warming is “unprecedented”; the Administrator’s Endangerment Finding stated that “The second line of evidence arises from indirect, historical estimates of past climate changes that suggest that the changes in global surface temperature over the last several decades are unusual.” (74 FR 66518) EPA found the scientific evidence “supports” this conclusion (see for example section 4 of the TSD), not that it compels it, as petitioners incorrectly assert. EPA clearly characterized the uncertainty in this line of the evidence, properly stating that there is significant uncertainty in the temperature record prior to 1600 A.D. (see section 4(b) of the TSD).

This comparison to past temperature estimates is also only one part of the paleoclimate evidence. Other parts, not contested by petitioners, include (1) the correlation and interactions over time between periods of higher greenhouse gas concentrations and higher temperatures, and (2) the use of temperature reconstructions to evaluate and improve climate models. Overall, this comparison of current to past temperatures is but one part of one line of evidence in attributing current warming to greenhouse gases; it is not the primary line of evidence. The petitioners have not shown that EPA failed to properly characterize this evidence, and the petitioners’ assertions regarding EPA’s treatment and reliance

²² National Research Council (NRC) (2006). Surface Temperature Reconstructions For the Last 2,000 Years. National Academy Press, Washington, DC.

²³ D’Arrigo, R. *et al.* (2008). On the “divergence problem” in northern forests: a review of the tree-ring evidence and possible causes, 60 *Glob. Planet. Chng.* 289. Esper, J. and D. Frank (2009). Divergence pitfalls in tree-ring research. *Clim. Chng.* 94: 261, 262.

²⁴ Loehle, C. and J. H. McCulloch, 2008. Correction to: A 200-year global temperature reconstruction based on non-tree proxies. *Energy & Environment*. 19(1): 93–100.

²⁵ Mann, M.E. *et al.* (2008). Proxy-based reconstructions of hemispheric and global surface temperature variations over the past two millennia. *PNAS*. 105:36.

on this evidence are inaccurate and misleading.

Petitioners claim that characteristics of trends in the vertical temperature profile of the atmosphere should present a “fingerprint” of human-induced warming, and that this expected fingerprint has not been observed in the tropics, and that therefore the attribution of recent warming to human causes is placed into doubt. However, EPA recognized and already addressed this issue in the TSD (see section 5(a) of the TSD) which notes newer data sets are in general agreement with climate models in the tropics and therefore there is no longer an inconsistency. In addition, petitioners do not contest any of the other important pieces of evidence that link current warming to greenhouse gases, such as rates of sea level rise and Arctic ice loss.

Petitioners claim that the projections from climate models do not support attribution to greenhouse gases because the models have not explained why there may have been a slowdown in the rate of warming over the last 10 or so years. First, according to the latest NOAA (2010) data,²⁶ the decade spanning 2000–2009 was substantially warmer than the prior decade (1990–1999) (see also the figure in Response 1–22 in Volume 1 of the RTP document). The exact rate of warming in the past decade depends on one’s choice of temperature record and the start and stop date chosen for computing a trend in that record. Second, whether models can reproduce a short-term slowdown in the warming in no way invalidates their use for attributing or projecting long-term changes in global climate from anthropogenic forcing of the climate system. The latter long-term projections are their primary purpose, not year-to-year projections of changes over a period of around a decade or less. In addition, recent studies indicate that short-term trends can run counter to overall long term trends, and the climate models can reproduce this.

The IPCC, NRC, and EPA’s TSD appropriately reflect the state of the science and discussed the areas of uncertainty in temperature reconstructions. They fully considered the entire body of evidence, including the kinds of evidence and arguments presented by petitioners. In contrast, petitioners generally have not considered the breadth of evidence on these issues, and they fail to acknowledge the comprehensive treatment of these issues in the

assessment reports. They have instead relied upon a limited selection of information that does not warrant the broad conclusions they draw.

Petitioners’ evidence does not materially change or warrant any less reliance on the other important lines of evidence linking greenhouse gases and climate change: Our basic physical understanding of the effects of changing greenhouse gas concentrations and other factors; the broad, qualitative consistency between observed changes in climate and the computer model simulations of how climate would be expected to change in response to anthropogenic emissions of greenhouse gases (and aerosols); as well as other important evidence of an anthropogenic fingerprint in the observed warming.

b. Validity of the HadCRUT Surface Temperature Record

Petitioners present five major arguments regarding the validity and use of the HadCRUT temperature record. In particular, they claim that: (1) Alleged destruction of raw data for the HadCRUT temperature record renders the scientific data on surface temperature worthless and makes replication of temperature trends impossible; (2) comments within code and log files are evidence of manipulation that “undercuts the credibility of CRU databases;” (3) a report allegedly claims to show that the Russian stations used in the HadCRUT temperature record were selectively chosen to show increased warming; (4) the IPCC improperly relied on Jones *et al.* (1990)²⁷ for its conclusions about the magnitude of the urban heat island effect; and (5) the allegedly faulty HadCRUT temperature record is the primary basis for the conclusion of “unprecedented” warming and the foundation of anthropogenic global warming analyses. In effect petitioners use these claims to contest the existence or amount of recent warming.

As background, monitoring the changes in the Earth’s surface temperature is only one of several key components of studying climate change. Other indicators of climate change include receding glaciers, shrinking Arctic sea ice, and sea level rise, as well as a number of other temperature-sensitive physical and biological changes, such as bird migration patterns and changes in the length of the growing season.

Surface temperature records are built on data collected from thousands of weather stations around the world, as well as sea surface temperature records taken by ships crossing the ocean on different routes, with some data going back more than 100 years. Because the data originates from many international sources, some quality control is required such as checking for and deleting data that are shown to be duplicate, or adjusting to account for inconsistent reporting methodologies. Additionally, these weather stations and their data were not originally intended to be used for long-term climate monitoring, and sometimes adjustments are necessary to avoid confusing a local artificial temperature change (e.g., due to a shift in the elevation of a monitoring station) with large-scale or global temperature patterns.

The three major temperature record developers, CRU, NOAA, and NASA, all use different approaches for these adjustments. The approach by CRU is the only one of the three that relies on a substantial set of manual adjustments globally. NOAA uses an automated algorithm to adjust for discontinuities such as might be expected from station moves, with additional corrections in the U.S. because a large number of stations changed measurement instrumentation as well as the time of day of temperature readings. NASA uses NOAA’s adjustments for the U.S. as an input, but uses an algorithm that identifies urban centers based on satellite observations and adjusts those urban centers to have trends that are consistent with nearby rural stations. In addition, the data are not evenly situated around the planet, and need to be extrapolated and averaged so that areas with many stations are not overrepresented and areas with few stations are not underrepresented. The kinds of adjustments made to the underlying raw data are designed so that the surface temperature analyses reflect as much as possible the actual direction and magnitude of any change in surface temperature and do not reflect other changes, such as changes in measurement devices.

The temperature reconstructions generally do not evaluate the average actual surface temperature, but rather determine the changes in temperature, both regionally and globally. The emphasis on changes in temperature is important, because they are better correlated with large regional changes. For example, two nearby stations—one on top of a mountain and one in the valley—will likely have different absolute temperatures, but are likely to

²⁶ <http://www.ncdc.noaa.gov/sotc/?report=global&year=2009&month=13&submitted=Get+Report#temp>.

²⁷ Jones, P.D., P.Y. Groisman, M. Coughlan, N. Plummer, W.-C. Wang, and T.R. Karl (1990). Assessment of urbanization effects in time series of surface air temperature over land. *Nature* 347:169–172.

have similar changes in temperature over time.

CRU also maintains a dataset known as TS3.0, with TS2.1 as an older version. This dataset is different from HadCRUT, and includes various climate metrics and data information not in HadCRUT. TS2.1 is referred to in IPCC AR4 only twice in relation to historical precipitation data. Almost all of the references to global temperatures over time that refer to CRU data refer to the HadCRUT temperature record, and not the TS3.0 or 2.1 datasets.

(i) Raw Data.

Several petitioners claim that CRU has not kept all of the raw data from the surface weather stations, only the adjusted data, e.g. corrected for station moves and measurement changes, and therefore the evidence for warming in the past century is questionable and cannot be independently replicated.

CRU acknowledges that it did not keep a small percent of the raw weather station data collected since the 1980s and that it cannot release other raw data because of agreements with national meteorological organizations. CRU has provided a detailed explanation for its handling of the data, and EPA already addressed this issue at length in Response 2–39 of the RTC. Not retaining a small amount of the raw data does not interfere in a material way with replication or development of independent estimates of global or regional surface temperature history. The vast majority of the raw weather station data is indeed publicly available from the Global Historical Climate Network (GHCN) and other public data sources, contrary to the petitioners' assertions. An independent estimate of global temperatures can be generated, as NASA/GISS, NOAA/NCDC, and other groups have done. The separate NASA and NOAA analyses of global surface temperature records find similar temperature increases and strongly support the conclusion that the HadCRUT surface temperature record accurately reflects the changes in temperature. The UK Independent Climate Change E-Mails Review was able to download raw data and produce global temperature trend results similar to the other analyses in less than two days. In addition, the major conclusions about warming based on the HadCRUT temperature record have remained robust, even as CRU integrated more data and refined its methodologies over two decades.

The petitioners do not provide any global analysis of the available data from temperature stations that yields a different result. Further, they have provided no evidence that an additional

or different analysis using the publicly available temperature data would yield a different result from the warming reflected in the HadCRUT, NOAA and NASA analyses of global surface temperature. It is an unwarranted leap in logic to assume these analyses have no merit because a small percentage of the underlying raw data is no longer in CRU's possession.

(ii) Biased Methods.

Petitioners claim the various methods that CRU used to integrate and adjust the surface temperature data introduce biases in the temperature record that were designed to support the view that global surface temperatures are increasing faster than they actually are. The petitioners refer to this as "manipulation" and cite several CRU e-mails and other documents as support. A couple of fragments of code and a debugging log (*HARRY_READ_ME.txt*) are quoted extensively as support for these claims.

EPA has thoroughly reviewed all of the disclosed CRU e-mails in light of the petitioners' claims, and EPA responds to all of the petitioners arguments in detail in Volume 1 of the RTP document. Here, EPA focuses on two of the most well-known CRU documents:

BRIFFA_SEPT98_PRO and
HARRY_READ_ME.txt.

The code fragment *BRIFFA_SEPT98_E.PRO* that includes a comment in the header for the code that states that the code "APPLIES A VERY ARTIFICIAL CORRECTION FOR DECLINE" is over a decade old and appears to be provisional test code. The comments in capital letters are to remind the programmer to replace the temporary fudge factors with more valid adjustments before the code is used for public products. It further appears that the "fudge" factor highlighted by petitioners is not related to the HadCRUT temperature record, but instead refers to the divergence issue discussed above and the unrelated WMO report. The petitioners do not show that the *BRIFFA_SEPT98_E.PRO* code has any relationship to the HadCRUT temperature record or that it was actually used for any public final product.

The *HARRY_READ_ME.txt* debugging notes are a record of attempts to update the CRU TS product by merging six years of additional data to an old data set and migrating the code to a new computer system at the same time. The petitioners fail to acknowledge that the CRU TS products are different from the HadCRUT temperature record that is referred to in the assessment reports and the EPA TSD, and they improperly assert that issues with the TS products

directly call into question the HadCRUT temperature record. The file referred to by petitioners does indicate that there were a number of difficult quality control issues that had to be addressed concerning new data, the code written for the updating process, and the old code for producing TS2.1. The full debugging log demonstrates that a number of the identified problems were successfully fixed. Many of the quotes highlighted by petitioners were expressions of frustration that were not related to the quality of the product. A number of the problems were related to inconsistencies involving reported WMO codes used to identify weather stations. These inconsistencies have previously been highlighted in the literature, and the approach to address them as related in the log file was similar to the approaches detailed in previous papers. In sum, the *HARRY_READ_ME.txt* file is focused on issues that do not relate to the HadCRUT temperature record and contains no evidence of any attempts to bias any output data.

(iii) Biased Dataset.

Petitioners claim that CRU scientists selectively chose Russian data stations to create a biased dataset that would show more warming than would the full dataset. To support this argument, they provide a link to a translation (hosted at a blog) of a report written in Russian by the Institute for Economic Analysis in Moscow (Pivovarova, 2009).²⁸

Examination of this document indicates that the Moscow Institute for Economic Analysis temperature record using the full set of Russian stations agrees well after 1955 with the temperature record that the Institute derived from the set of stations used in the HadCRUT temperature record, and that the difference between temperature records derived from the two datasets is mainly in the 1850 to 1950 portion. However, the method used by the Institute for Economic Analysis to compare the two temperature datasets was an improper comparison of apples and oranges (i.e., the HadCRUT temperature record uses a different geographic weighting approach than did the Institute for Economic Analysis, which is more important when the data is sparse as it is before 1955).

Petitioners also do not support their claim that CRU selectively picked stations. EPA has found no evidence in

²⁸ Pivovarova, N. (2009). Institute for Economic Analysis (IEA): How warming is made. The case of Russia. (December 15, 2009). Available at: http://www.iea.ru/article/kioto_order/15.12.2009.pdf; translation at: <http://climateaudit.files.wordpress.com/2009/12/iea1.pdf>. Last accessed on April 26, 2010.

the CRU e-mails or the information provided by petitioners to indicate that stations were chosen by CRU scientists. CRU uses a number of data sources and the petitioners did not assess whether these data sources included the missing Russian stations, or whether the stations met criteria discussed in published papers (see volume 1 of the RTP document).

(iv) Urban Heat Island Corrections.

Petitioners criticize the urban heat island corrections as another alleged example of temperature data manipulation.

This issue is not new. EPA addressed urban heat island issues in responses 2–28 through 2–30 of the RTC document. Referencing Jones *et al.* (1990)²⁹ and other studies, IPCC AR4 concludes that “urban heat island effects are real but local, and have not biased the large-scale trends.” In addition, satellite records are not susceptible to urban heat island effects and globally show similar trends to land-based measurements over their overlapping time period. EPA summarized this information in the TSD. EPA’s specific responses to the petitioners’ arguments are provided in Volume 1 of the RTP document.

(v) Faulty Temperature Record Used by IPCC.

Petitioners claim the allegedly faulty HadCRUT temperature record is the primary or core support for IPCC conclusions on current warming, attribution, and projections of future warming, thus calling into question the fundamental conclusions of IPCC AR4 and EPA’s use of IPCC AR4 as a primary reference to support the Endangerment Finding.

First, for reasons stated above and detailed further in Volume 1 of the RTP document, EPA disagrees with the petitioners’ claims that the HadCRUT temperature record is faulty. Second, as noted previously, multiple independent assessments of climate change science by not only the IPCC but also USGCRP and NRC have concluded that warming of the climate system in recent decades is “unequivocal.” This conclusion is not drawn from any one source of data, but is based on a review of multiple sources of data and information, which includes the HadCRUT temperature record, additional temperature records from other sources, and numerous other independent indicators of global warming (see section 4 of EPA’s TSD).

NOAA and NASA surface temperature records show nearly

identical warming trends to the HadCRUT temperature record, despite different analysis methodologies. Moreover, entirely independent records of lower tropospheric temperature measured by both weather balloons and satellites demonstrate strong agreement with the surface temperature records of all three organizations. The TSD also discussed the following additional indicators of global warming:

- Increasing global ocean heat content (Section 4(f) of the TSD).
- Rising global sea levels (Section 4(f) of the TSD).
- Shrinking glaciers worldwide (Section 4(i) of the TSD).

Changes in biological systems, including poleward and elevational range shifts of flora and fauna; the earlier onset of spring events, migration, and lengthening of the growing season; and changes in abundance of certain species (Section 4(i) of the TSD).

It is this entire body of evidence that supports the conclusion that there is an unambiguous warming trend over the last 100 years, with the greatest warming occurring over the past 30 years. Contrary to petitioners’ claims, the models used to generate projections of future warming described in IPCC AR4 do not directly rely on the HadCRUT or other surface temperature records. These models are driven by physical equations describing the radiative properties and dynamics of the atmosphere and oceans and parameterizations of small-scale processes, not observed temperature data.

In summary, EPA disagrees with the premise of this claim—that the HadCRUT temperature record is faulty—and therefore disagrees that use of the HadCRUT temperature record within IPCC AR4 has somehow corrupted the IPCC’s conclusions. In addition, the petitioners’ claim that the HadCRUT temperature record is such a central thread to the entire IPCC AR4 that this would then invalidate all IPCC AR4 conclusions is unsupported and exaggerated.

c. Validity of NOAA and NASA Temperature Records

A number of petitioners question the validity of NOAA and NASA surface temperature records, raising claims concerning station “drop-out,” flawed or manipulative adjustments to data, and a lack of independence between the three major surface temperature records. EPA’s response clearly shows that (1) petitioners rely on a questionable, non-peer-reviewed source which contains a number of inaccurate statements and relies on a scientifically flawed analysis;

(2) petitioners demonstrate a fundamental scientific misunderstanding of what issues actually would lead to either a warming or cooling bias in the temperature record; and (3) petitioners fail to acknowledge that climatic records other than land surface temperature records also show clear warming trends.

As background, one of the sources of data for the HadCRUT temperature record is the GHCN, which was developed and is maintained by NOAA. The GCHN dataset is also used by both NOAA and NASA in their surface temperature records. NOAA, NASA, and CRU each calculate global surface temperature trends from a combination of GHCN data and other data sources. Each group performs different adjustments and corrections to the data, and in some cases uses different subsets of the GHCN data or includes other outside datasets.

Petitioners contest certain individual aspects or details of the surface temperature evidence, and in general raise objections that fail to recognize the various approaches used to develop the global surface temperature record. Many of the issues raised by the petitioners are not new, and have been addressed previously within the TSD and RTC document. Some objections fail to recognize that the change in temperature is being evaluated, not the absolute temperature level. Other objections misconstrue the underlying studies cited by the petitioners. In several cases, petitioners object that various adjustments to the raw data have the effect of changing the data, but they fail to consider that adjustments are appropriately performed, for example, to account for circumstances that otherwise would interfere with accurately isolating and determining a real trend in surface temperature. Petitioners fail to address the reasons behind the adjustments and fail to explain or show that the types of adjustments made in developing such datasets from multiple sources of data are not appropriate. Likewise, petitioners fail to account for the valid data-driven reasons that have led to a reduction over time in the number of weather stations used for the surface temperature analysis, fail to explain or show that the reductions have biased the temperature record, and overstate the magnitude of the temperature station reductions in some cases.

Consistency between all three separate surface temperature records (NASA, NOAA, CRU), as well as consistency between the three surface temperature records and other evidence of warming, such as satellite data, ocean

²⁹ Jones, P.D., P.Y. Groisman, M. Coughlan, N. Plummer, W.-C. Wang, and T.R. Karl (1990). Assessment of urbanization effects in time series of surface air temperature over land. *Nature* 347:169–172.

temperature data, and physical evidence of the effects of warming, should be seen as confirmation of the evidence of warming. Petitioners appear to assume that all of this evidence must be wrong because they, incorrectly (see above), allege that some of it is.

(i) Station Drop-out.

Petitioners raise a number of issues regarding the alleged “drop-out” of stations after 1990, and the extrapolation of data from “warmer” areas to “colder” areas due to this drop-out or for other reasons. They claim this leads to bias in the global surface temperature record. Volume 1, section 1.4.3.1 of the RTP document addresses these claims in detail, and EPA’s summary of the issue follows.

Many of the petitioners’ arguments rely on a non-peer-reviewed document by D’Aleo and Watts (2010).³⁰ However, the study and the source upon which it relies do not support petitioners’ claims and conclusions. D’Aleo and Watts (2010) provide no evidence that there was a systematic and purposeful “weeding out” process. Peterson and Vose (1997),³¹ the paper describing the GHCN dataset, describes the procedures for updating the GHCN database and explains that there are fewer measuring stations post-1992 than during the 1980s because only three of the data sources were being updated on a regular basis.

The D’Aleo and Watts study assumed that dropping stations at higher latitudes and in colder climates would result in a biased, warmer temperature trend. This unfounded assumption is a misunderstanding of the basic methodology used in analyzing surface temperature data. The surface temperature record sets evaluate the change in temperature over time at the various stations, not the absolute temperature level. The change in temperature over time is what indicates whether warming is occurring, not just the absolute temperature itself; for example, the Arctic region has been experiencing the highest rates of warming in the world, yet average Arctic temperatures are obviously still considerably colder than temperatures in most other world regions where average temperatures may not have increased as much. Petitioners incorrectly assume and do not explain

why dropping these stations would bias the trend in the change in temperature toward greater warmth. In fact, petitioners fail to acknowledge that colder, high latitude areas are the regions of the world where the most warming is occurring, and is expected to continue occurring. If one were to accept this line of the petitioners’ original argument, there should have been concern about a bias towards less warming, not more warming.

Moreover, the D’Aleo and Watts study used simple averages of absolute temperatures at the stations—without, apparently, taking into account their geographic distribution, much less calculating the change in temperature at the stations. This improper methodology is a significant error that undermines the petitioners’ critique of the temperature records.

Furthermore, satellite data is available for the time periods of land-based station “drop-out”, and the satellite temperature record is broadly consistent with surface temperature trends throughout the period when the “drop out” was occurring, confirming that the reduction in the number of data stations has not created a warming bias.

Additionally, analyses using only stations with continuous records are almost identical to analyses using only stations which were “dropped” over the decades before the “drop-out”, further undermining the petitioners’ claim that a warming bias was introduced by the station “drop-out”.

(ii) Improper Heat Island Adjustments.

Petitioners assert that the urban heat island adjustments performed by NASA are insufficient or improperly applied, both globally and in the U.S. Southeastern Legal Foundation points to the study Long (2010)³² as support for this assertion. These assertions are addressed in detail in volume 1, section 1.4.3.2 of the RTP document, and EPA’s general response is summarized here.

The Long (2010) study found that the net effect of NOAA adjustments to the raw data led to more warming in rural stations (the NOAA adjustments for the U.S. are also used in developing the NASA temperature record). Neither the petitioners nor Long show, however, that the adjustments to rural stations were inappropriate. (As stated above, adjustments are sometimes necessary to ensure a real, and not artificial,

temperature change is being recorded when, for example, there might be a change in the elevation of the station or the daily timing of temperature readings.) Importantly, Long does not take into account either the changes in the time of observation or the changes in instrumentation at many rural stations, both of which led to temperature discontinuities that must be accounted for (*e.g.*, through adjustments) in order to accurately portray the actual long-term temperature trend.

With respect to the claimed failure to account for the urban heat island effect (where metropolitan areas tend to be warmer than surrounding areas due to built up land surfaces and building materials that retain heat), this issue was raised previously during the public comment period and EPA has addressed this in the RTC document. Response 2–28 of the RTC document makes clear that all of the different surface temperature datasets shown or cited in the TSD account for the urban heat island effect, either directly and/or indirectly. The TSD, citing IPCC (Trenberth *et al.*, 2007), summarized this issue as the following: “ * * * urban heat island effects are real but local, and have not biased the large-scale trends.” Note also that the oceans are warming and that the most rapid land-based warming is occurring in the Arctic, two areas where urban heat island effects are obviously not an issue.

(iii) Data Adjustments.

Petitioners cite the records of some individual stations that they claim show inappropriate manipulation, referring to stations in Australia and New Zealand.

The evidence and arguments about data adjustments in New Zealand do not support the claim that these adjustments were invalid, after taking into account station history and neighboring station records. While there is some evidence that the automated algorithm may have introduced a spurious trend in one station in Australia in the NOAA temperature record (but not in the CRU or NASA temperature records), there was at least one valid reason for adjustment, and there is no evidence that this error in one station biases the large-scale global temperature trends. There is certainly no evidence of “chicanery” involved in these adjustments, as one petitioner claimed.

Petitioners focus on individual stations or limited areas. It is not surprising that data from one station or one region would show a large difference between adjusted and unadjusted data. The important point is that when the stations and regions are combined for a global analysis, these

³⁰ D’Aleo and Watts (2010). Surface Temperature Records: Policy Driven Deception? Available at: http://scienceandpublicpolicy.org/originals/policy_driven_deception.html. Accessed: April 8, 2010.

³¹ Peterson, T. C. and R. S. Vose (1997). An overview of the global historical climatology network temperature data base. Bull. Am. Met. Soc., 78: 2837–2849.

³² Long, E.R. (2010). Contiguous U.S. Temperature Trends Using NCDC Raw and Adjusted Data for One-Per-State Rural and Urban Station Sets. Available at http://scienceandpublicpolicy.org/images/stories/papers/originals/Rate_of_Temp_Change_Raw_and_Adjusted_NCDC_Data.pdf. Accessed April 8, 2010.

kinds of effects are balanced out and do not produce a bias in the overall result. EPA addresses these issues for the specific station data at issue in New Zealand and Australia in greater detail in Volume 1, section 1.4.3.4 of the RTP document.

(iv) Independence of the NOAA and NASA Temperature Records. Some petitioners claim that the NOAA and NASA temperature records are not independent from the HadCRUT temperature record, developed by CRU, because they share some of the same raw data, and thus are assumed to also share some of the same alleged problems. EPA addresses these claims in volume 1, section 1.4.3.5 of the RTP document, and summarizes the response here.

The three major temperature records do rely on a large amount of raw data obtained from GHCN, though the HadCRUT temperature record in particular integrates additional data obtained from other, independent sources. As discussed above and throughout volume 1 of the RTP document, petitioners have not demonstrated any major flaws in the raw data. In addition, the processing of the GHCN data by the three groups is carried out independently from one another; therefore the similarities of the final temperature trends among the three groups provide additional confidence in those independent processing methodologies, and additional confidence in the consistent result that average global temperatures are increasing.

d. Implications of New Studies and Data Submitted by the Petitioners

Several petitioners identify scientific studies most (but not all) of which were published around the time of or shortly after the Administrator's December 2009 Endangerment Finding, as well as data not previously considered as part of the scientific record for the Endangerment Finding. Petitioners argue these studies and data have the potential to alter our understanding of key aspects of the science and therefore warrant reconsideration of the Findings. Petitioners also argue that EPA ignored or misinterpreted scientific data that were significant and available when the Finding was made. These studies and data issues involve:

- Implications of a new study on stratospheric water vapor.
- Implications of material concerning whether carbon dioxide is well-mixed in the atmosphere and whether the airborne fraction of carbon dioxide has changed.

- Implications of new tropical cyclone studies.
- Implications of new data on observational snow cover trends.
- A claim that EPA ignored a satellite dataset.

Though some of these studies are new, they do not raise new issues that had not already been accounted for in the assessment literature used by EPA. Furthermore, petitioners misinterpret the findings of these new studies, make unsupportable claims, rely on incomplete and biased analyses, do not acknowledge important results, and, at times, ignore EPA's record. Contrary to the petitioners' claims, the new science cited by the petitioners does not undermine the key findings and conclusions that were reached in the assessment literature and the scientific foundation for the Administrator's Findings. EPA's study-by-study responses to the petitioners' assertions can be found in volume 1, section 1.5 of the RTP document.

2. Issues Raised by EPA's Use of the IPCC AR4 Assessment

The objections raised by petitioners involving EPA's use of IPCC AR4 include (a) claims that recently found errors in IPCC AR4 undermine the IPCC's credibility and therefore EPA's use of IPCC AR4 as a primary reference document to support the Findings; and (b) claims that the IPCC has a policy agenda and is not an objective scientific body. These issues are addressed here and in greater detail in volume 2 of the RTP document.

a. Claims That Errors Undermine the IPCC AR4 Findings and Technical Support for Endangerment

The petitioners allege certain errors and unsupported statements in IPCC AR4 show that the science EPA relied upon is uncertain and/or not credible. Petitioners focus on the errors found regarding the timing of future projected melting of Himalayan glaciers, the percentage of the Netherlands below sea level, and a few more minor issues highlighted in the petitions. Each of these identified and alleged errors in IPCC AR4 has been examined in detail by EPA in Volume 2 of the RTP document; the general response is provided here.

EPA has reviewed these IPCC AR4 issues in the context of the key IPCC AR4 conclusions that were germane to the Administrator's Endangerment Finding. The small number of errors and alleged errors in the IPCC AR4 report are not materially relevant for EPA's Endangerment Finding. Neither of the two errors that are verifiable

(Netherlands sea level and Himalayan glaciers) are relevant to impacts in the United States and neither are part of the basis for the Endangerment Finding. Furthermore, there is no evidence that these two confirmed minor errors are an indication of a more serious problem with the quality and reliability of any other findings and conclusions from the IPCC AR4, including those that are relevant for the Endangerment Finding.

The remaining alleged errors, taken from non-peer-reviewed ("gray") literature, do not appear to be errors according to EPA's review. The IPCC provides guidance on how and when to use gray literature, and petitioners do not demonstrate that the guidance was not followed. Gray literature is not automatically incorrect or suspect, and an examination of the particular gray literature sources demonstrates that the petitioners' allegations regarding these alleged errors are unfounded. Furthermore, the IPCC AR4 statements at issue have no material relevance to EPA's Findings. Below are brief responses as to why the petitioners' assertions based on these known and alleged errors are unfounded and exaggerated. Additional detail on these issues is contained in Section 2.1, Volume 2 of the RTP document.

(i) Percent of the Netherlands Below Sea Level

The IPCC AR4 erroneously stated that 55 percent of the Netherlands is below sea level, whereas the actual number is only 26 percent. The statistic quoted in the AR4 was inaccurate, and a correction was published by the Netherlands Environmental Assessment Agency. What should have been stated is that 55 percent of the Netherlands is at risk of flooding; 26 percent of the country is below sea level, and 29 percent is susceptible to river flooding. The error originated with the Netherlands Environmental Assessment Agency, not the IPCC. The IPCC published an official erratum (IPCC, 2010b)³³ correcting the mistake, and noted "The sea level statistic was used for background information only, and the updated information remains consistent with the overall conclusions."

EPA does not refer to or rely on this statistic in the Findings and the percentage of the Netherlands below sea level does not pertain to the endangerment of public health and welfare in the United States. This error is very minor and has no impact on the

³³ IPCC (2010b). Fourth Assessment Report: Working Group II Erratum. Intergovernmental Panel on Climate Change (IPCC). 26 Jan. 2010. http://www.ipcc.ch/publications_and_data/ar4/wg2/en/errataserrata-errata.html.

climate science and health and welfare impacts supporting EPA's Endangerment Finding. Furthermore, there is no evidence that this minor error is somehow, as the petitioner would allege, an indication of flawed science and poor quality control practices sweeping across all conclusions of IPCC AR4.

(ii) Himalayan Glacier Projection

Several petitioners state that the IPCC AR4 erred in projecting that glaciers in the Himalayas would disappear by 2035, and that EPA relied on this projection.

The IPCC did inaccurately state the year 2035 in that particular statement. The IPCC issued a correction concerning the melting of Himalayan glaciers (IPCC, 2010c)³⁴ which also found that its general conclusion (provided below) on this issue remains robust and "entirely consistent with the underlying science."

Widespread mass losses from glaciers and reductions in snow cover over recent decades are projected to accelerate throughout the 21st century, reducing water availability, hydropower potential, and changing seasonality of flows in regions supplied by meltwater from major mountain ranges (e.g., Hindu-Kush, Himalaya, Andes), where more than one-sixth of the world population currently lives.

EPA did not refer to the original IPCC projection in either its TSD or in the Administrator's Endangerment Finding. It does not impact climate change science findings or have any meaningful implication for the issue of endangerment in the United States. Furthermore, Volume 2, section 2.1.3 of the RTP document shows that EPA reviewed the entire discussion of glacial effects in IPCC AR4 and concludes that this single faulty projection does not compromise the IPCC's overall assessment of observed glacier loss, projected glacier loss, and the impacts of glacier loss on water resources in the Himalayas.

(iii) Characterization of Climate Change and Disaster Losses

The Southeastern Legal Foundation asserts that the IPCC AR4 mischaracterized the findings of a study on climate change and historic disaster losses. EPA addresses the specific study at issue in Volume 2, section 2.1.4 of the RTP document and provides its more general response to this study and this issue here.

³⁴ IPCC, 2010c. IPCC Statement on the Melting of Himalayan Glaciers, January 20, 2010. <http://www.ipcc.ch/pdf/presentations/himalaya-statement-20january2010.pdf>.

First, EPA never cited or relied on the study at issue in its TSD. EPA did not discuss the link between climate change and the historic trends in the economic magnitude of disaster losses in the TSD. To support the Endangerment Finding, EPA cited the potential future impacts of climate change on the number and severity of extreme weather events, for which the Southeastern Legal Foundation levels no criticism. There are many different factors influencing the economic losses from a disaster, making it difficult to determine the impact of climate change from historic data on trends in economic disaster loss. Therefore, contrary to petitioners' claims, EPA did not rely on historic trends of economic disaster losses (the subject of the study at issue) to evaluate the likelihood that climate change would lead to an increase in the number or frequency of such weather events. EPA instead focused on the physical and environmental (not the economic) impacts associated with climate change. The Administrator's Endangerment Finding was clear that it was more forward-looking on this issue, stating:

The evidence concerning how human-induced climate change may alter extreme weather events also clearly supports a finding of endangerment, given the serious adverse impacts that can result from such events and the increase in risk, even if small, of the occurrence and intensity of events such as hurricanes and floods. (74 FR 66526)

Furthermore, EPA's review of the particular study at issue in Volume 2, section 2.1.4 of the RTP document shows that IPCC did not mischaracterize this study (e.g., IPCC included the appropriate caveats that were also stated in the underlying study), and that there were valid reasons for IPCC to use the study (e.g., as the most recent study of its kind at the time).

(iv) Validity of Alps, Andes, and African Mountain Snow Impacts

Several petitioners argue that IPCC claims of glacier melt in the Andes, the Alps, and parts of Africa arise from a magazine article and a Master's thesis, and thus should not be viewed as credible. This particular issue is addressed in Volume 2, section 2.1.5 of the RTP document, and EPA's response is summarized here.

First, the extent to which snow and glaciers in the Andes, Alps and parts of Africa are melting or are projected to melt is an issue that is tangential to the Administrator's decision that public health and welfare are endangered within the United States. Second, the petitioners mischaracterize these references within IPCC AR4, as these are actually references to "loss of ice

climbs," not reductions in mountain glaciers. Loss of ice climbs is an indicator of warming over ice-covered areas. EPA acknowledges that these references come from gray literature but these citations are appropriate and within the IPCC's guidelines for use of gray literature. They provide additional evidence consistent with the peer-review-supported conclusion that in most places snowpack is declining and glaciers are melting worldwide. Furthermore, EPA did not rely on these references or refer to "loss of ice climbs" as an indicator of climate change.

(v) Validity of Amazon Rainforest Dieback Projection

Petitioners challenge the IPCC's statement that "[U]p to 40 percent of the Amazonian forests could react drastically to even a slight reduction in precipitation," alleging that it is unsubstantiated gray literature. EPA reviews this issue in Volume 2, section 2.1.6 of the RTP document and provides its general response here.

The IPCC AR4 statement in question about the Amazon appears to have been inadequately referenced but the content of the statement is correct according to the underlying literature. For this statement, the IPCC did cite gray literature³⁵, which itself cited a peer-reviewed study³⁶ and relied on other peer-reviewed literature. It is worth noting that a newspaper that originally reported this alleged problem with the IPCC's representation of this Amazon issue recently reversed itself and printed a correction on June 20, 2010.³⁷ Moreover, this issue is not discussed in the TSD and is of no relevance to the Findings.

(vi) Validity of African Rain-Fed Agriculture Projection

Some petitioners object that a statement in EPA's TSD based on a statement in IPCC AR4 concerning reduction of yields from rain-fed agriculture in some countries in Africa was from gray literature and is therefore not credible. EPA reviews this issue in Volume 2, section 2.1.7 of the RTP document and provides its general response here.

There is no evidence that the IPCC statement in question regarding African

³⁵ Rowell, A. and P.F. Moore (2000). Global Review of Forest Fires. World Wildlife Federation and The World Conservation Union. available at: <http://data.iucn.org/dbtw-wpd/edocs/2000-047.pdf>. (last accessed April 12, 2010).

³⁶ Nepstad, D. C., et al. (1999). Large-scale impoverishment of Amazonian forests by logging and fire. *Nature* 398:505-508.

³⁷ Sunday Times correction. http://www.thesundaytimes.co.uk/sto/news/uk_news/Environment/article322890.ece.

rain-fed agricultural yields is not credible, based on the underlying studies, nor is there any evidence that IPCC authors acted inappropriately by citing the material on which this statement is based. The IPCC statement cites a report³⁸ published by the International Institute for Sustainable Development funded by Canada, U.S. AID, and other public and private institutions. The percent reduction number was obtained from vulnerability studies prepared under the UN Environmental Programme Global Environment Fund and National Communications of three African countries to the UNFCCC. This study was included due to the paucity of peer-reviewed material relating to some parts of the world, particularly Africa. This is consistent with the IPCC's guidance on the use of gray literature. Furthermore, the statement relates to impacts outside the United States, and it did not materially impact the Administrator's determination of endangerment of public health and welfare in the United States.

b. Response to Claims That the IPCC Has a Policy Agenda and is Not Objective and Impartial

Several petitioners raise various arguments to support their allegation that IPCC AR4 is advancing a policy agenda and is not an objective and impartial scientific body, thus questioning EPA's use of IPCC AR4 as a significant reference document to support the Administrator's Findings.

EPA reviews and responds to each of these claims in Volume 2, section 2.2 of the RTP document, and provides the more general responses here. EPA also previously responded to public comments about IPCC's report development procedures in the RTC document (see Volume 1, section 1 and Appendix A, "IPCC Principles and Procedures").

The petitioners submit four objections along with excerpts from the CRU e-mails related to: (1) Authorship and reviewer roles among IPCC personnel; (2) a CRU e-mail allegedly showing that IPCC authors were aware that citing their own papers could be seen as using the IPCC process to advance their own views rather than to present a neutral overview of the science; (3) allegations that the IPCC is a biased organization, including claims that IPCC lead authors encouraged other authors to focus on

policy-prescriptive science; and (4) allegations that IPCC authors forced consensus and altered the contents of the assessment reports to eliminate any suggestion of non-consensus.

After reviewing the petitioners' arguments, EPA finds that the evidence and arguments provided by petitioners do not support their serious allegation that the peer-review and assessment report processes employed by the IPCC were "fundamentally corrupt" and policy prescriptive. The petitioners' arguments, which heavily rely on the selective use and narrow reading of CRU e-mails, as well as some newspaper articles, do not demonstrate that the IPCC peer-review and report development processes were inadequately designed or that they were not properly implemented. These allegations by the petitioners are devoid of any scientific evidence or scientific argument that would cause EPA to find that the key conclusions of IPCC AR4 are inaccurate or that they do not appropriately reflect the degree of scientific consensus on the scientific issues germane to the Administrator's Endangerment Finding. Therefore, petitioners' evidence and arguments do not support changing EPA's position, as stated in the Endangerment Finding, that the assessment literature, including IPCC AR4, represents the "best reference materials for determining the general state of knowledge on the scientific and technical issues before the agency in making an endangerment decision."

Volume 2, section 2.2.3.1 of the RTP document, for example, demonstrates that, contrary to petitioners' assertions, a few scientists that were not named as contributing authors for Chapter 6 of IPCC AR4, Working Group I³⁹ did not contribute significantly to the writing and editorial decisions of that chapter. Given their very limited role in the chapter (*e.g.*, providing input on a single figure), it is entirely reasonable that they were not named contributing authors, who are charged with writing parts of the report. Therefore, EPA finds that there is no basis for the claim that IPCC reviewer and author procedures were circumvented. EPA's review of this issue is consistent with the finding of the Independent Climate Change E-mails Review⁴⁰ which stated, among other things, that "There is no proscription in the IPCC rules to prevent the author team seeking expert advice when and where needed."

Petitioners appear concerned about the contributing author designation because these few scientists were expert

reviewers of the IPCC AR4, and the petitioners believe that the act of providing even a limited amount of information, in addition to their reviewer roles, would have given them undo power to shape the report. This argument is baseless. EPA notes that although the expert review comments are available to the public⁴¹, petitioners did not provide a single example from the comments of these individuals to support their claim of undo influence or abuse of their purported "power" over IPCC AR4 conclusions.

Volume 2, section 2.2.3.2 of the RTP document examines the allegation by petitioners that the frequency with which IPCC authors cite their own studies should be viewed as unacceptable and seen as evidence that IPCC AR4 lacks objectivity. First, it should come as no surprise that for some of these fairly specialized fields of climate change science authors who publish the most on these topics would in turn be selected by IPCC to author chapters on those same topics. EPA finds the frequency with which IPCC authors cite their own peer-reviewed studies to be entirely acceptable and reasonable. Again, petitioners completely fail to show why this underlying cited literature itself is flawed or why the IPCC AR4 conclusions, based on this underlying literature, are flawed. Importantly, one of the CRU e-mails that petitioners use as purported evidence of IPCC authors engaged in foul play to cite their own work actually shows an IPCC coordinating lead author explicitly encouraging his IPCC co-authors to minimize citations to their own work, and to do so only "unless they are absolutely needed."

Volume 2, section 2.2.3.3 of the RTP document examines the petitioners' assertion that IPCC is biased and that IPCC authors worked to produce policy-prescriptive science and to reach preconceived conclusions. Here too, the petitioners do not address any of the IPCC AR4 science directly. Rather, petitioners refer to a selection of CRU e-mails by IPCC authors who wrote to other IPCC co-authors to urge them, for example, to focus on "policy relevant" science. First, "policy relevant" by no means implies "policy prescriptive" or scientifically biased. It is, in fact, policy informative and neutral, in direct contrast to the goal of policy

³⁸ Agoumi, A. (2003). Vulnerability of North African Countries to Climatic Changes. International Institute for Sustainable Development and the Climate Change Knowledge Network. (2003). Available at: http://www.cckn.net/pdf/north_africa.pdf. Accessed April 12, 2010.

³⁹ Jansen *et al.*, 2007.

⁴⁰ Russell, 2010.

⁴¹ Reviewer comments and author responses for draft chapters of IPCC AR4 Working Group I and II volumes (the primary volumes at issue for the Endangerment Finding) are publically available at the following Web sites, respectively: <http://hcl.harvard.edu/collections/ipcc/> and <http://ipcc-wg2.gov/publications/AR4/ar4review.html>.

prescriptive statements. Second, petitioners do not identify how specific information in IPCC AR4 should be considered biased as a result of the private e-mail exchanges. Petitioners do not highlight the specific statements in the IPCC AR4 that are supposedly “policy prescriptive,” never explain what policy agenda was being advanced, and never describe how the CRU e-mails support their claim that the science was actually manipulated in service of this unspecified agenda. The IPCC’s own guidelines⁴² state that its mission is to produce information that is “policy relevant and policy neutral, never policy prescriptive.” There is no evidence provided by petitioners that IPCC authors deviated from this practice.

In another example in Volume 2, section 2.2.3.3 of the RTP document, petitioners claim that a CRU e-mail exchange demonstrates that IPCC authors were colluding to make a strong case about a certain scientific conclusion rather than working to produce neutral science. EPA’s review shows that there is no support for this claim. EPA’s review shows that the CRU e-mails, in their full context, speak for themselves and simply show a small group of scientists working on various alternative ways to present a figure that was comprehensive and offered key contextual information on temperature trends over the past several centuries. Petitioners do not show that these alternatives—which are discussed in the e-mails—are biased, or explain why the option that was selected is not “neutral.” If fact, the e-mail record shows that the alternative selected was the most comprehensive and transparent of the options.

In Volume 2, section 2.2.3.4 of the RTP document, EPA reviews petitioners’ claim that certain IPCC authors kept out some studies with the goal of hiding any non-consensus on key issues. The CRU e-mail exchanges among some IPCC authors are the only pieces of evidence offered by petitioners to support this allegation. EPA’s review of this issue demonstrates that the CRU e-mails simply do not show that the contents of the IPCC chapter in question, let alone the contents of the entire IPCC AR4, were altered to eliminate a suggestion of non-consensus, or IPCC authors actively tried to suppress (or were successful in suppressing) external challenges to consensus. It is not uncommon for scientists to critique the work of others, and the e-mails do not provide evidence that the IPCC authors acted unethically.

Section 2.2.3.4 of the RTP document also addresses the now oft-cited e-mail where an IPCC author states, “I tried hard to balance the needs of the science and the IPCC, which were not always the same.” Petitioners claim this e-mail demonstrates a biased IPCC process. A simple reading of the entire e-mail exchange reveals a different story. In fact, this IPCC author gets complimented from another for his objectivity and even-handedness in handling the challenges of working on IPCC AR4. This IPCC author also expressed frustration with the time spent away from doing new science, which is not the primary job of an IPCC chapter author or of the IPCC in general; the primary role of the IPCC is to assess existing science already published in the literature, *i.e.*, in this author’s words, “the needs of the science and the IPCC” are not always the same. In context, it is clear that the needs of the IPCC in this case are the requirements of doing assessments of existing literature rather than producing “original and substantive” work. EPA’s review demonstrates that when the e-mails are read in their full context, it is clear that the authors of these e-mails sought to convey the science accurately and address disagreements in a fair and even-handed way. Again, petitioners have selectively picked excerpts from these e-mails to make assertions attacking the underlying science of the Endangerment Finding, but these assertions simply have no support.

3. Process and Other Issues Raised by the Petitioners

The process and other issues raised by the petitioners include claims that (a) the USGCRP and the NRC are not separate and independent assessments from IPCC; (b) EPA’s process to develop the scientific support for the Findings is flawed; (c) there are improper peer-review processes in the underlying scientific literature used by the major assessments; and (d) certain scientists did not adhere to Freedom of Information Act requests. Each of these issues is addressed below and in more detail in Volume 3 of the RTP document.

a. Claims That the Assessments by the USGCRP and NRC Are Not Separate and Independent Assessments

Two petitioners argue that the assessment reports upon which EPA relied are not from three separate, independent groups. They claim that the USGCRP and NRC assessment reports are not separate and independent because they are based on the findings of IPCC AR4. Petitioners

claim the USGCRP and NRC reports regularly cite and rely on data, resources, and conclusions in the IPCC reports, contradicting arguments that all three of the assessments are separate and independent. The petitioners argue that because of this the USGCRP and NRC assessments must be flawed in the same way that IPCC AR4 is purported to be flawed by the petitioners. Volume 3, section 3.2 of the RTP document addresses this claim and EPA summarizes its response here.

EPA finds no merit to this argument. The organizational and personnel differences, and the detailed and robust report development procedures employed by the IPCC, USGCRP, and NRC demonstrate that these assessment reports are separate and independent. Petitioners’ claims to the contrary are insufficient and unsubstantiated.

The similarity of the conclusions among the assessment reports from the three bodies, for example, provides evidence of the strength of the science in that it consistently points different scientific reviewers in the same direction. The fact that each of these bodies referenced many of the same studies and IPCC AR4 or arrived at consistent conclusions is not evidence that these reports are not independent assessments of the available science related to climate change. The test of separation and independence is not whether an assessment reaches a different result or conclusion, it is whether independent discretion and judgment were exercised. To assert, as the petitioners do, that consistency of results represents a weakness rather than a strength of the underlying science is an unwarranted argument that assumes fundamental flaws in the IPCC and a resulting grand ripple effect across all the major assessments used by EPA. EPA discusses above and further demonstrates throughout the RTP document that there is no material or reliable basis to question the validity and credibility of the body of science underlying the Administrator’s Endangerment Finding, including the IPCC AR4 conclusions and its underlying studies, and therefore EPA rejects the premise of this argument.

Furthermore, the USGCRP, the IPCC, and NRC have their own, separate report development procedures. These separate processes have already been described in the TSD and in the RTC document, Volume 1. The differences in the organizations, the groups of scientists who developed the assessments, and scope of the assessments produced by each body is discussed in detail in Volume 1 of the RTC document.

⁴² IPCC, 2010c.

- The IPCC, created in 1988 by the United Nations Environment Programme and the World Meteorological Organization (WMO), is open to all member countries of the United Nations and the WMO. At regular intervals, the IPCC prepares comprehensive assessments of scientific, technical, and socio-economic information relevant for the understanding of human-induced climate change, potential impacts of climate change, and options for mitigation and adaptation all at global and regional scales. The most recent assessment—the AR4—included thousands of scientists from all over the world, who participated on a voluntary basis as authors, contributors, and reviewers (IPCC, 2007a). While many federal and nonfederal scientists from the United States were involved in the development of the AR4, the United States is just one of 194 countries that contribute to the assessments.

- The USGCRP is part of the United States Executive Branch. Thirteen departments and agencies participate in the USGCRP, including EPA. A critical role of the interagency program is to coordinate research and integrate and synthesize information to achieve results that no single agency, or small group of agencies, could attain. Between 2004 and 2009, the USGCRP produced 21 synthesis and assessment reports on a wide range of topics (e.g., temperature trends in the lower atmosphere; weather and climate extremes in a changing climate; and the effects of climate change on agriculture, land resources, water resources, and biodiversity). The USGCRP assessment reports are developed to enhance understanding of natural and human-induced changes in the Earth's global environmental system; to monitor, understand, and predict global change in the United States; and to provide a sound scientific basis for national and international decision-making. Each of these reports had a unique team of authors, drawn from relevant disciplines. Many authors were federal scientists, and in some cases, nonfederal scientists contributed their expertise to the process. While some of the USGCRP authors participated in the development of the IPCC AR4, most did not.

- The NRC is an independent scientific organization that is not affiliated with either the IPCC or USGCRP. As described in Appendix C of Volume 1 of the RTC document, the NRC:

enlist(s) the nation's foremost scientists, engineers, health professionals, and other experts to address the scientific and technical aspects of society's most pressing problems.

Each year, more than 6,000 of these experts are selected to serve on hundreds of study committees that are convened to answer specific sets of questions. All serve without pay. Federal agencies are the primary financial sponsors of the Academies' work. Additional studies are funded by state agencies, foundations, other private sponsors, and the National Academies endowment. The Academies provide independent advice; the external sponsors have no control over the conduct of a study once the statement of task and budget are finalized. Study committees gather information from many sources in public meetings but they carry out their deliberations in private in order to avoid political, special interest, and sponsor influence.

Ten NRC reports are cited in the Endangerment Finding and TSD. Each of these reports has a unique author committee, selected based on their areas of expertise. While some of the NRC study committee members have participated in either the IPCC or USGCRP report development processes, many have not.

The USGCRP and NRC reports on which EPA relied were the result of an objective review and assessment of the scientific literature available at the time of their development (including any previously published assessments), related to the effects of greenhouse gas emissions on the climate system and the impacts of these changes on ecosystems and society. The organizations conducting the reviews were distinct and separate, and neither organization had control or supervision over the other. The groups of scientists involved in the reviews overlapped to some degree, but significant numbers of scientists were involved with one but not other reports. In all cases, personnel at NRC who supervised the review and preparation of the final reports were different from those who performed these functions for USGCRP.

Like the IPCC, the USGCRP and NRC provide public opportunities to provide input and comment during report development (see RTC document, Volume 1). In addition, the NRC reports undergo a rigorous, independent external review by experts whose comments are provided anonymously to the committee members.

Separate and apart from the issue of the independence of these assessment reports, the petitioners provide no information to demonstrate that the key scientific conclusions of the IPCC, USGCRP, and NRC are wrong or that EPA erred in relying upon them. The specific science issues raised by petitioners are discussed throughout this Decision and in the RTP document. Thus, whether or not the various assessment reports are separate and

independent, EPA reasonably relied upon them as reflecting the current state of the science and the degree of broad consensus within the science community on these issues.

Bolstering the case that the IPCC, USGCRP and NRC assessments available at the time of the final Endangerment Finding in December 2009 were robust and appropriate for EPA to use, the May 2010 assessment of the NRC, "Advancing the Science of Climate Change," states that its major scientific conclusion is "consistent with the conclusions" of those previous assessments. Note also that this May 2010 NRC assessment was able to incorporate scientific literature published since EPA completed its scientific record to finalize the 2009 Endangerment Finding.

b. Approaches and Processes Used To Develop the Scientific Support for the Findings

Several petitioners object to the process and approach EPA used in developing the scientific support for the Endangerment Finding. One of these specific arguments is new whereby the petitioners allege that EPA ignored public concerns about the implications of the e-mails involving scientists at the CRU, and instead "plowed ahead with compromised data, undermining its core conclusions in the process." EPA discusses and responds to this issue in section (i) below and in section 3.1.2 of the RTP document. The petitioners also raise issues that EPA already responded to in Volume 1 of the RTC document. Some of the concerns submitted are supported with "new information" and some are not. In (ii) below, EPA summarizes the response to the claim that EPA did not independently judge the underlying science, and in (iii) below EPA concludes that the Agency did not violate the Information Quality Act (IQA, or the Data Quality Act), as alleged by petitioners. Section 3.1.3 of the RTP document more fully responds to these three allegations and other related concerns raised by the petitioners regarding the process and approach EPA used in developing the scientific support for the Endangerment Finding.

(i) Issues Regarding Consideration of the CRU E-mails

The sole new argument raised by petitioners regarding the approach and process EPA used into develop the Findings is that EPA ignored public concerns about the implications of the e-mails involving scientists at CRU, and instead "plowed ahead with compromised data, undermining its core

conclusions in the process.” EPA responds to this issue in Volume 3, section 3.1.2 of the RTP document and summarizes its response here.

Prior to finalizing the Endangerment Finding, EPA carefully reviewed many of the CRU e-mails, and determined that many of the issues raised therein had also been raised through the public comments on the proposed Findings. EPA reviewed the underlying scientific issues that were presented to EPA at the time (see, for example, RTC Volume 2). Based on that initial review, EPA concluded that the fundamental conclusions of the assessment literature remained sound as to the state of the science on greenhouse gases and climate change. EPA did not inappropriately “plow ahead;” EPA assessed the issues raised by commenters and the CRU e-mails in light of our comprehensive review of climate science and all of the objections to the science raised by commenters, and concluded that our review of the science and the conclusions based on it were sound.

Petitioners have now raised more specific concerns with respect to the CRU e-mails. EPA has reviewed all of the CRU e-mails, and our responses to the particular science issues raised by petitioners in light of these e-mails are provided in other sections of this Decision and in the RTP document. As discussed there, petitioners have routinely misunderstood or mischaracterized the scientific issues, drawn faulty scientific conclusions, resorted to hyperbole, impugned the ethics of climate scientists in general, characterized actions as “falsification” and “manipulation” with no basis or support, and placed an inordinate reliance on blogs, news stories, and literature that is often neither peer reviewed nor accurately summarized in their petitions. Petitioners often “cherry-pick” language that creates the suggestion or appearance of impropriety, without looking deeper into the issues or providing corroborating evidence that improper action actually occurred.

(ii) Claims That EPA Did Not Independently Judge the Underlying Science

Several petitioners argue that the Administrator did not independently judge the primary scientific literature and data. Instead, they claim that she improperly relied on summary scientific reports produced by third parties or “foreign entities.” This is not a new issue brought to EPA, but was raised and addressed during the public comment period. Section III.A of the Findings responds to comments that

EPA should have conducted its own independent assessment of the primary scientific literature and not relied on scientific reports produced by third parties such as the USGCRP, NRC or IPCC. See also Volume 1 of RTC document, particularly Response 1–1.

It is useful to describe the process EPA followed in exercising its scientific judgment in making the Endangerment Finding. EPA did not passively and uncritically accept a scientific judgment and finding of endangerment supplied to it by outsiders. Instead, EPA evaluated all of the scientific information before it, determined the current state of the science on greenhouse gases, the extent to which they cause climate change, how climate change can impact public health and public welfare, and the degree of scientific consensus on this science. EPA applied this science to the legal criteria for determining endangerment, *i.e.*, whether greenhouse gases cause, or contribute to, air pollution that may reasonably be anticipated to endanger public health or welfare. EPA did this after presenting its scientific views before the public for comment and evaluating and considering all comments received, as well as documenting responses to all significant public comments (see volumes 1–11 of the RTC document). EPA properly and carefully exercised its own judgment in all matters related to the Endangerment Finding.

The core of petitioners’ objection is that they do not agree with important parts of the scientific information upon which EPA relied. They frame this as a failure of EPA to exercise its own judgment, or as EPA ceding to an outside body its responsibility to exercise independent judgment. It is clear from the record for the Findings that EPA exercised its own judgment and did not cede its authority or judgment to anyone. The fact that petitioners disagree with the information EPA relied upon and EPA’s conclusions is not evidence of a lack of exercise of discretion or judgment.

EPA relied on the existing assessment reports of the USGCRP, IPCC, and NRC as a primary source for determining the current state of the science relating to greenhouse gases and climate change, and for determining the degree of scientific consensus on these issues. EPA’s view then and now is that these assessment reports represent the best primary references to provide the scientific underpinnings to inform the Administrator’s judgment regarding endangerment. These assessment reports provide exactly the kind of information that is required, *i.e.*, they

demonstrate how greenhouse gases are affecting the climate now, are projected to affect climate in the future, and how these current and projected climate changes impact public health and welfare. These assessment reports also bring together and synthesize the numerous individual studies in the scientific literature to draw overarching conclusions about the state of the science. Finally, each of these assessment reports go through rigorous and transparent peer-review processes, such that the conclusions carry significant weight in a way that is typically not possible for one individual study in a scientific journal. EPA’s review of the objections raised by petitioners to the process and the substance of the various assessment reports does not support changing this view.

The petitioners appear to imply that EPA would have drawn different conclusions had it conducted its own separate assessment. After examining the breadth and quality of the USGCRP, IPCC, and NRC assessments, EPA disagrees. These reports already reflect the body of underlying scientific literature that EPA itself would have had to synthesize had it decided to conduct yet another assessment, independent from USGCRP, IPCC and NRC. These assessments have been reviewed and formally accepted by, commissioned by, and in some cases authored by U.S. government agencies and individual government scientists. By relying on the assessment literature, EPA is benefitting from the confidence and strength of an entire federal research enterprise. There is no reason to think that these assessments do not represent the best primary source material to determine the state of science on the relevant issues.

Petitioners disagree with some of the conclusions of the assessment literature and believe that not all scientific points of view were fully considered therein. However, there was a robust public comment process on EPA’s proposed Endangerment Finding, which provided an opportunity for the public to evaluate and comment on EPA’s preliminary scientific conclusions. Many commenters provided literature and/or arguments to support their views and EPA reviewed such literature and arguments in the Agency’s responses. EPA’s final judgment was based on EPA’s evaluation of both the assessment literature and the additional information and views provided through public comment. EPA has no reason to believe that putting this significant body of work aside and attempting to develop a new and separate assessment would

provide any better scientific basis for making the endangerment decision.

(iii) Claims That EPA Violated the Information Quality Act

EPA already provided a detailed response to arguments of alleged IQA violations in RTC Volume 1. The petitioners now make essentially the same general argument that EPA's use of third-party assessment reports violates the IQA. EPA notes that the petitioners are re-raising this issue in the petitions for reconsideration because they believe that the CRU e-mails show that "IPCC authors deleted information and hid behind foreign laws to avoid disclosure of key data" and that EPA would not have been able to obtain the data anyway. EPA responds to allegations involving the behavior of CRU scientists, including the allegation that data was destroyed, in (c) below, Volume 1 of the RTP document and Sections 3.3 and 3.4 of the RTP document. As stated in these sections, the evidence submitted by the petitioners in the form of the CRU e-mails does not support their allegation that data were destroyed. Therefore, the "new" information presented by the petitioners does not call into question the overall integrity of the science, nor does it call into question the process EPA used in developing the Findings. As noted in RTC Volume 1, the IQA requires that an agency issue guidelines regarding data quality and ensure their implementation. EPA complied with the IQA by issuing its *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility and Integrity of Information Disseminated by the Environmental Protection Agency* (U.S. EPA, 2002)⁴³ and has acted consistently with these guidelines in developing the Findings. As stated in RTC Volume 1, EPA's use of the assessment literature "is consistent with these guidelines because we thoroughly reviewed and evaluated the author selection, report preparation, expert review, public review, information quality, and approval procedures of IPCC, USGCRP/CCSP, and NRC to ensure the information adhered to a basic standard of quality, including objectivity, utility, and integrity."

The CRU e-mails cited by the petitioners do not undermine this view. EPA's responses on the science issues raised by petitioners concerning these e-mails are discussed in detail in several

other sections of this Decision as well as in the RTP document. As our detailed responses show, petitioners' science-based claims do not support the conclusion that the IPCC or other assessment reports were biased, inaccurate, or scientifically incorrect.

c. Freedom of Information Act Issues

Several petitioners claim that the CRU e-mails provide evidence that leading climate scientists deliberately withheld key data and computer codes and attempted to obstruct or avoid UK Freedom of Information (FOI) and U.S. Freedom of Information Act (FOIA) requests from "climate skeptics." These claims are addressed in Volume 3, section 3.4 of the RTP document and EPA's response is summarized here.

EPA's review of the CRU e-mails indicates that in many cases, the data at issue were in fact released by the scientists, including data concerning a human "fingerprint" in the tropics, data underlying the HadCRUT temperature record, and data concerning historic temperature reconstructions. In addition, significant data were publicly available. Petitioners have not explained or shown why the amount of data and other information that was available was not adequate for researchers to replicate or otherwise evaluate key findings, or to conduct other research. In addition, there was a robust and public process to submit, review, and publicly respond to comments on the scientific issues involved in all parts of the IPCC AR4. Petitioners do not rely on science or science based arguments to support their claim that the assessment report resulting from this robust process should not be relied upon by EPA. Instead, they rely on unsupported conclusions drawn from e-mails concerning a FOI request for personal communications between various scientists, where it appears that the appropriate University FOI officers had determined that these e-mails were exempt from release. This evidence does not support petitioners' claims that the IPCC AR4 should not be considered as part of the scientific basis for the Endangerment Finding.

EPA agrees with the results of the various investigations, which found that the scientists at issue conducted their research with scientific integrity and rigor, the research utilized methods which are fair and satisfactory, and that their actions were consistent with the common practice in climate research at that time. EPA also agrees with the recommendations of the Independent Climate Change E-mails Review supporting greater transparency in the future in this area of climate research.

Petitioners' evidence, however, does not support their conclusions that the research produced by these scientists was suspect, flawed, or biased, or that IPCC AR4 or other assessment reports were suspect, flawed, or biased. Their evidence does not support the conclusion that the science at issue should not be relied upon by EPA.

EPA has reviewed the petitioners' claims and the e-mails and finds that in many cases, the petitioners make overly broad generalizations based on suggestions of inappropriate actions that are not supported by the evidence provided by the petitioners. Regarding the quote from the UK Information Commissioner's Office, the recent inquiry by the UK House of Commons Science and Technology Committee (2010)⁴⁴ concluded that this statement was the personal opinion of the Deputy Information Commissioner and was not based on the results of a formal government investigation.

EPA finds that most of the language in the CRU e-mails that petitioners allege shows impropriety is taken out of context. Petitioners do not provide corroborating evidence that improper action actually occurred, let alone evidence that any alleged improper action led to biased or inaccurate science that was ultimately used by EPA to support the Findings. Based on our review of the e-mails, the authors were dismayed at what they viewed as frivolous requests that were wasting their time, not that the requestors were going to uncover "fraud" or "wrongdoing" with regard to their research, as has been alleged by the petitioners.

EPA finds from its review that the e-mail authors expressed significant frustration at repeated requests for specific explanations and computer codes when the basic data had already been made available and the methodology for replicating particular studies had already been published in the literature. This type of approach was considered to be common practice at the time, as the UK House of Commons Science and Technology Committee (2010)⁴⁵ also found in their analysis of the CRU e-mails: "In the context of the sharing of data and methodologies, we consider that Professor Jones's actions

⁴³ U.S. EPA (2002). *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by the Environmental Protection Agency*. Washington, DC: U.S. Environmental Protection Agency. EPA/260/R-02/008.

⁴⁴ UK Parliamentary (2010). House of Commons, Science and Technology Memoranda. Available at: <http://www.publications.parliament.uk/pa/cm200910/cmselect/cmsctech/memo/climatedata/contents.htm>.

⁴⁵ UK Parliamentary (2010). House of Commons, Science and Technology Memoranda. Available at: <http://www.publications.parliament.uk/pa/cm200910/cmselect/cmsctech/memo/climatedata/contents.htm>.

were in line with common practice in the climate science community. It is not standard practice in climate science to publish the raw data and the computer code in academic papers.” EPA finds that the petitioners’ evidence does not provide a basis to question the scientific integrity or conclusions of the climate change research conducted by CRU researchers.

d. Integrity of Peer-Reviewed Literature

Several petitioners claim that the CRU e-mails provide evidence that leading climate scientists engaged in actions to suppress dissenting views about anthropogenic global warming. Specifically, petitioners claim that these scientists unfairly gave favorable reviews of each other’s manuscripts while providing negative reviews of manuscripts authored by “climate skeptics,” made efforts to unfairly expedite publication of their responses to papers by “climate skeptics,” conspired to remove editors of prominent journals that had published dissenting views of climate change, and boycotted the journals in reprisal. The petitioners argue that the cumulative effect of these alleged actions with regard to peer-reviewed literature has been to create an artificial consensus about anthropogenic climate change that has “tainted [climate change literature] in favor of desired papers.” Some petitioners conclude that EPA has lost the basis for its Findings because the Agency assumed a “legitimate, objective ‘consensus’ regarding anthropogenic global warming” existed among scientists and disregarded any contrary views or contrary evidence. EPA responds to these claims in Volume 3, section 3.3 and summarizes its response here.

Petitioners’ claims are not based on scientific analysis or arguments, and their evidence does not support changing or revising EPA’s use of the major assessments of peer-reviewed literature or the overall scientific conclusions about climate change reached from the thousands of papers considered in the assessments. The objections raised by the petitioners have not called into question or changed EPA’s conclusion that the science supporting the Endangerment Findings is robust, compelling, and has been appropriately characterized by EPA.

EPA disagrees with the petitioners’ argument that the Findings were based on a false consensus regarding anthropogenic climate change, and that EPA disregarded contrary views or evidence including those not represented in the peer-reviewed literature. For reasons stated throughout

this Decision and section 3.3 of the RTP document, EPA’s view is that the state of the science has been carefully and appropriately characterized by EPA and properly interpreted by the Administrator in the Endangerment Finding.

Many diverging viewpoints and a variety of findings are represented in the scientific literature on climate change. The assessment reports routinely identified the degree of certainty around any conclusion and recognized the existence of ongoing debate within the scientific community on all of these issues, as is the norm in all science endeavors. The Administrator’s Endangerment Finding relied on a careful consideration of the full weight of scientific evidence and a thorough review of hundreds of thousands of public comments, which contained many different opinions and interpretations of the science. Therefore, to claim, as the petitioners do, that these e-mails demonstrate that EPA did not take into account any dissenting views on the subject of climate change science is a gross mischaracterization of the total record that supports the Administrator’s Findings.

The petitioners rely upon some CRU e-mails (typically taken out of context), a small number of papers, and both actual and alleged events regarding scientific journals to claim that leading climate scientists conspired to keep dissenting views of climate change out of the broad body of peer-reviewed literature and create an artificial consensus about anthropogenic climate change. In all cases presented by the petitioners it appears the scientists involved were making their scientific objections known, and were basing their objections on the science and not on assumptions or speculation. The evidence presented by petitioners does not support their claims of bias, either for the specific papers and individuals at issue, or for the much broader and sweeping challenges made concerning the integrity of all peer-reviewed climate literature.

For the few papers at issue, the petitioners do not argue based on scientific merits, and instead assume that the few papers they cite received unjustified unfavorable reviews and were unfairly rejected for publication without providing supporting evidence. Petitioners do not address the possibility that these papers were scientifically inadequate and that the scientists were justified in recommending that they not be published. EPA notes that there is no evidence presented beyond these few papers of the claimed general effort to

manipulate the peer-reviewed journal publication process.

The evidence provided by the petitioners also does not show that the scientists engaged in improper behavior or sabotage of the two journals that are discussed in the e-mails, or their editors, nor is there evidence to conclude that any action on the part of these scientists involved in the e-mail correspondence resulted in the replacement of the journal editors. Our review of the full discussion of the e-mails indicates, again, that petitioners have exaggerated the significance of actual or purported events in an attempt to cast doubt on the underlying science and the processes relied upon to produce the science.

F. Petitioners’ Arguments Do Not Meet the Standard for Reconsideration

As discussed above, petitioners must demonstrate that their objections are of central relevance to the outcome of the underlying decision, and must demonstrate either that it was impracticable to raise the objections during the public comment period or that the grounds for raising such objections arose after the close of the comment period (but within the time specified for judicial review). The above analysis shows that science-based and other objections discussed in this Section III and the accompanying support document are not of central relevance to the Administrator’s decision on endangerment and thus reconsideration is properly denied.

An objection is of central relevance if it provides substantial support for the argument that the underlying decision should be revised. As shown above, none of the petitioners’ arguments related to climate science and data issues, issues raised by EPA’s use of IPCC AR4, and process issues provide substantial support for the argument that the Administrator’s Endangerment Finding should be revised. The petitioners’ arguments and evidence are inadequate, generally unscientific, and do not show that the underlying science supporting the Endangerment Finding is flawed, misinterpreted by EPA, or inappropriately applied by EPA. Importantly, petitioners’ claims and the information they submit do not change or undermine our understanding of how human emissions of greenhouse gases cause climate change and how human-induced climate change generates risks and impacts to public health and welfare. The information provided by petitioners does not change any of the scientific conclusions that underlie the Administrator’s Findings, nor do the petitions lower the degrees of

confidence associated with each of these major scientific conclusions.

A petition for reconsideration cannot merely cite to new information and claim that is sufficient to require initiating a reconsideration process, attendant with the same procedures as the original decision. Mere allegations that information is of central relevance will not suffice. New information, even new information related to an agency decision, does not by itself warrant undermining the finality of agency decision making. To justify reconsideration a petitioner must show why the new information demonstrates that the agency's decision should be changed.

Petitioners fail to do this. The core defect in petitioners' arguments is that these arguments are not based on consideration of the body of scientific evidence. Petitioners fail to address the breadth and depth of the scientific evidence and instead rely on an assumption of inaccuracy in the science that they extend even to the body of science that is not directly addressed by information they provide or by arguments they make. Petitioners routinely take private e-mail communications out of context and assert they are "smoking gun" evidence of wrongdoing and scientific manipulation of data. In contrast, EPA's careful examination of the e-mails and their full context shows that the petitioners' claims are exaggerated and are not a material or reliable basis to question the validity and credibility of the body of science underlying the Administrator's Endangerment Finding or the Administrator's decision process articulated in the Findings themselves. Petitioners' assumptions and subjective assertions regarding what the e-mails purport to show about the state of climate change science are woefully inadequate pieces of evidence to challenge the voluminous and well documented body of science that is the technical foundation of the Administrator's Endangerment Finding.

Petitioners' objections that a limited number of factual mistakes now identified in the IPCC AR4, as well as other claimed mistakes, call into question the climate science supporting the Administrator's Endangerment Finding, are similarly flawed. The two factual mistakes in IPCC AR4 confirmed by EPA's review are tangential and minor and do not change the key IPCC AR4 conclusions that are central to the Administrator's Endangerment Finding.

Finally, as shown above, regarding objections based on allegedly new scientific studies and data, EPA's review of these claims shows that in many

cases the issues raised by the petitioners are not new, but were in fact considered prior to issuing the Endangerment Finding. In other cases, the petitioners have misinterpreted or misrepresented the meaning and significance of recent scientific literature, findings, and data. Finally, there are instances where the petitioners have failed to acknowledge other new studies in making their arguments. Thus, petitioners have failed to demonstrate that their objections related to climate science and data issues, issues raised by EPA's use of IPCC AR4, and process issues provide substantial support for the argument that the Administrator's decision on endangerment should be revised.

Moreover, regarding many of their objections, petitioners also fail to demonstrate that it was impracticable to raise the objections during the public comment period or that the grounds for raising such objections arose after the close of the comment period (but within the time specified for judicial review). In many but not all cases EPA has identified instances where petitioners fail to base an objection on such new information. Given the volume of individualized comments and objections, EPA is identifying some of the types of situations where the objection, or grounds for the objection, raised by a petitioner does not satisfy this requirement for reconsideration. Several types of objections are premised on studies and other information that were available before the close of the comment period. In some cases petitioners basically repeat or raise the same arguments that were raised and responded to in the rulemaking. In other cases, petitioners raise allegedly new grounds, such as CRU e-mails, that they claim should cause EPA to reconsider a prior comment, or that justifies petitioners' raising a new issue for the first time in the reconsideration petition. But as explained above and throughout this Denial and supporting documents, the allegedly new information is not of central relevance, and therefore, EPA essentially is left with arguments that either were made previously during the comment period, or could have been raised during the comment period. Thus, many of the petitioners' objections not only are not of central relevance, but they also fail to meet the temporal requirement for a petition for reconsideration.

IV. Other Issues

In this section, EPA responds to various objections to the Endangerment Finding based on concerns raised with respect to the impact of stationary source permitting requirements, the

relationship of the Findings to NHTSA's recent CAFE rule, the effects of the Findings and subsequent rulemakings on states and businesses, the need for a Formal Rulemaking Process, and EPA's justification for its exercise of discretion in making the Endangerment Finding.

A. The Tailoring Rule/Impacts of PSD and Title V Permitting Are Not of Central Relevance to the Findings

Several petitioners raise objections based on EPA's proposed rule to tailor the Prevention of Significant Deterioration (PSD) and title V permit programs for greenhouse gases. Proposed Prevention of Significant Deterioration (PSD) and Title V Greenhouse Gas Tailoring Rule, 74 FR 55292 (Oct. 27, 2009) (Proposed Tailoring Rule).⁴⁶ Specifically, petitioners argue that EPA's statements in the Proposed Tailoring Rule demonstrate that the Findings are contrary to law and/or arbitrary and capricious. Because the Proposed Tailoring Rule was issued after the close of the comment period, but before the period for judicial review ran, petitioners argue that it presents reasons for EPA to reconsider the Findings in general.

Petitioners argue that the Proposed Tailoring Rule is of central relevance to the Findings because it involves the PSD and title V permitting requirements that flow as an inevitable result of the Findings, and the impacts of such permitting are relevant to the Findings. *e.g.*, SLF 5th Supp. at 15; Ohio Coal Assn. at 4. They point to the fact that the Tailoring Rule was proposed, and comments thereon were received, after the close of the comment period for the Findings, and request that EPA grant reconsideration and re-open the Findings docket "to allow the public to comment on the implications of the Tailoring Rule[sic] to the form and content of the Endangerment Finding," SLF 5th Supp. at 15, and to "further explore the extent to which implementation of the Endangerment Finding is practically impossible * * * since impossibility calls into question all justification for the Endangerment Finding." Ohio Coal Assn. at 4.

At least one petitioner points to the alleged implementation problems identified in the Proposed Tailoring Rule and comments received thereon as a basis for reconsidering the appropriateness of the Findings. Ohio Coal Assn. at 6-9. The petitioner argues

⁴⁶The Final Prevention of Significant Deterioration (PSD) and Title V Greenhouse Gas Tailoring Rule was signed on May 13, 2010, and published June 3, 2010. 75 FR 31514 (June 3, 2010).

that despite statements in the final Findings that EPA did not consider, and indeed could not have considered, policy concerns about the repercussions of impact of the finding when making the endangerment finding, EPA did “give credence and expression” and “did in fact consider the widespread and economically crippling” PSD permitting implementation issues. Ohio Coal Supp. at 15, 18. Therefore, the petitioner continues, new information about EPA’s ability to tailor the PSD program justifies granting reconsideration. Specifically, the petitioner cites to comments filed by state permitting authorities that they allege call into question the approach EPA proposed in the Tailoring Rule to address the negative impacts that EPA acknowledges “would inexorably flow from the Endangerment Finding—that is, triggering the PSD and Title V permitting requirements at the low applicability levels provided under the Clean Air Act.” Ohio Coal Supp. at 16–18. They claim that statements made by state permitting agencies about the ability of the proposal to address state law concerns, and the remaining burden even at the higher thresholds all undermine EPA’s claim that it can fashion a reasonable and common-sense solution to the perceived problem. Thus, petitioners conclude, the “most viable and sensible option” would be instead for EPA to withdraw the Findings until the impacts of the PSD and title V permitting programs can be fully assessed and resolved. Ohio Coal Assn. at 8; Ohio Coal Supp. at 22.

Another petitioner provides slightly different reasons for claiming the Proposed Tailoring Rule necessitates granting reconsideration and re-opening the Findings for comment.⁴⁷ This petitioner argues that the Proposed Tailoring Rule reflects an acknowledgement by EPA that regulating GHG under the CAA is absurd. Chamber at 3. The petitioner also argues that new information demonstrates that some of the public health and welfare effects from stationary source emission reductions that EPA expected when issuing the Findings will be legally unavailable. *Id.* at 9–10. The petitioner alleges that EPA recognized the “ill-fit” between

pollutants like greenhouse gases, which become well-mixed in the atmosphere and cause global problems, and the existing structure of the CAA. The petitioner further claims that it was because of this ill-fit that EPA crafted the Tailoring Rule in order to avoid the absurd result of trying to regulate GHGs under part of the CAA. Petitioner’s suggested solution is for EPA to reconsider the Findings in light of EPA’s recognition that regulation of GHGs under the CAA is “absurd.” In so doing, the petitioner reiterates comments it, and others, submitted during the public comment period arguing that EPA retains discretion under *Massachusetts* to consider, among other things, the impacts of an endangerment finding when deciding whether to issue an endangerment findings. Chamber at 10–12.

More specifically, the petitioners argue that the Supreme Court decision did not address the issue of whether GHGs could be regulated under the CAA consistent with Congress’ intent and without triggering absurd results. Chamber at 11. Rather, they contend, the Supreme Court decision was about the narrow issue of whether GHGs were air pollutants under CAA section 202(a). Chamber at 11. Some petitioners argue that EPA should have informed the Supreme Court of the impact of a positive endangerment finding under CAA section 202(a) on stationary source permitting, and the fact that it may require EPA to resort to the absurdity doctrine; if EPA had, they continue, the Court may have issued a different opinion. CEI Supp. at 4–5. Another petitioner argues that the Supreme Court left open the option of EPA declining to make an endangerment finding, and that in making its decision EPA must adhere to the customary mode of statutory interpretation in *Chevron v. NRDC*, 467 U.S. 837 (1984), considering all relevant statutory language, legislative history and absurd results that may apply when regulating GHGs under the CAA. Chamber at 12.

Based on this alleged premise, the petition then turns to EPA’s statements in the Proposed Tailoring Rule concerning the potential absurd results that could result from applying the statutory permitting thresholds of 100 and 250 tons per year (tpy) to GHGs, and the additional administrative impossibility that would result from applying these statutory thresholds immediately when GHGs are regulated under CAA section 202(a). Petitioner submits additional evidence it alleges demonstrates the absurdity of regulating GHGs from stationary sources: (1) The PSD program is designed to address

pollutants with localized impacts in specific geographic areas (*e.g.*, the NAAQS), and not global pollutants like GHGs; (2) the statutory thresholds would require burdensome, expensive, individualized emissions controls at hundreds of thousands of small emissions sources, contrary to Congressional intent; and (3) the application of permitting to GHGs would jeopardize economic growth, which would be particularly absurd in the current economic situation. Chamber at 15–17.

Thus, according to this and other petitioners, EPA must reconsider the Findings in light of the absurd results that would result from GHGs being regulated pollutants under the PSD and title V permitting programs. See, *e.g.*, Chamber at 18; CEI Supp. at 5. Specifically, petitioners argue that the absurdity doctrine demands that EPA consider whether regulating GHGs under the CAA as a whole is absurd or not, but that EPA completely ignored this possibility when developing the Findings. Rather than relying on the absurd results doctrine to merely “tailor” the PSD and title V permitting programs, petitioners argue that EPA should rely on it to avoid creating the permitting program dilemma in the first place, or at the very least take comment on that option. Chamber at 18–19; CEI Supp. at 5. At least one petitioner contends that case law regarding the absurd results doctrine requires adopting the narrowest, most restrictive interpretation of the statute, and that there may be an interpretation that authorizes EPA to avoid making the endangerment finding in the first place, not one that merely addresses the PSD and title V statutory thresholds (*e.g.*, by interpreting “emissions” or “major emitting facility” narrowly). Chamber at 18–19. Petitioners argue that given EPA’s failure to consider this alternative, coupled with the alleged acknowledgement that the CAA motor vehicle rules are not necessary to achieve public health and welfare advantages in light of the NHTSA CAFE rule (see below), EPA must reconsider the Findings. See, *e.g.*, Chamber at 23.

Finally, other petitioners argue that the Proposed Tailoring Rule itself is illegal, pointing to numerous industry comments filed on the proposal. They contend that since the Tailoring Rule is illegal, it is “a patently unconstitutional attempt by the Executive Branch to unilaterally amend a statute.” SLF 5th Supp. at 16. In summary, they conclude that since EPA cannot regulate GHGs under the CAA without ignoring part of the statute, it cannot regulate GHGs in a manner consistent with the CAA and

⁴⁷ This petitioner also stated in its petition that if EPA had neither “granted the petition nor contacted the [petitioner] to establish a mutually agreeable schedule for reconsideration by April 14, 2010, such inaction will be deemed a denial of the petition.” Chamber at 1. No EPA action, or inaction, other than this Decision and supporting material constitutes a denial of the petitions. See, *e.g.*, Final LDVR, 75 FR at 25402; EPA’s Combined Opposition to Remand (filed April 29, 2010 in DC Cir. No. 09–1322).

any attempt to do so is beyond EPA's legal authority, arbitrary and capricious, and an abuse of discretion. *Id.* at 17–19. The petitioners also contend that EPA's Endangerment Finding is arbitrary and capricious and an abuse of discretion because, they allege, it is climatically pointless as well. They state that rather than undertake a course of illegal action, especially one that they allege does not have any detectable effect, EPA should start over and reconsider the Findings. *Id.*

EPA is denying the petitions for reconsideration that raise objections based on the Proposed Tailoring Rule because these objections are not of central relevance to the outcome of the final Findings and/or could have been raised during the public comment period.

These objections are not of central relevance to the Findings for three primary reasons discussed in more detail below. First, as EPA noted in the Findings, the impact of regulations that may flow from a positive endangerment finding, even if absurd, is not a relevant consideration to the science based question of whether air pollution may reasonably be anticipated to endanger public health or welfare. *See*, 74 FR at 66501, 66515–16; RTC volume 11 at 4–5. Thus, EPA disagrees with a fundamental basis for petitioners' objections based on the Proposed Tailoring Rule—*i.e.*, that EPA could or must decline to issue an endangerment finding under CAA section 202(a), regardless of the scientific evidence relevant to determining endangerment, based on concerns with implementing stationary source permitting. Second, even if the absurd results doctrine could influence EPA's interpretation of CAA section 202(a) after the Supreme Court's decision in *Massachusetts*, EPA's approach to resolving the absurdity is reasonable because it focuses narrowly on that part of the CAA where the absurdity originates while giving effect to other statutory provisions, in order to balance the goal of improving public health and the environment with the goal of avoiding absurd results. Third, EPA disagrees with the petitioners who argue that because EPA is relying on the absurd results doctrine as a result of the Findings, the Findings themselves must therefore be illegal. Reliance on a doctrine of administrative law when interpreting a statute is not an indication of the illegality of agency action; indeed, it shows just the opposite. By applying, *inter alia*, the doctrines of absurd results and administrative necessity, EPA has been able to issue effective regulations addressing greenhouse gases while

avoiding the absurd results that could arise from immediately applying the statutory thresholds for PSD and title V to greenhouse gases. Thus, petitioners' objections do not provide substantial support for the argument that the final Findings should be revised.

More specifically, EPA stated the following in the Findings in response to comments urging EPA to delay making an endangerment finding based on, among other things, concerns about the impact of the PSD program:

“EPA agrees with the commenters who argue that the Supreme Court decision held that EPA is limited to consideration of science when undertaking an endangerment finding, and that EPA cannot delay issuing a finding due to policy concerns if the science is sufficiently certain (as it is here). The Supreme Court stated that “EPA can avoid taking further action only if it determines that greenhouse gases do not contribute to climate change or if it provides some reasonable explanation as to why it cannot or will not exercise its discretion to determine whether they do” 549 U.S. at 533. Some commenters point to this last provision, arguing that the policy reasons they provide are a “reasonable explanation” for not moving forward at this time. However, this ignores other language in the decision that clearly indicates that the Court interprets the statute to allow for the consideration only of science. For example, in rejecting the policy concerns expressed by EPA in its 2003 denial of the rulemaking petition, the Court noted that “it is evident [the policy considerations] have nothing to do with whether greenhouse gas emissions contribute to climate change. Still less do they amount to a reasoned justification for declining to form a *scientific judgment*. *Id.* at 533–34 (emphasis added).

Moreover, the Court also held that “[t]he statutory question is whether sufficient information exists to make an endangerment finding” *Id.* at 534. Taken as a whole, the Supreme Court's decision clearly indicates that policy reasons do not justify the Administrator avoiding taking further action on the question here” (74 FR 66501, December 15, 2009).

Furthermore, EPA noted the following when responding to comments arguing that EPA should consider the impact of regulating GHGs when determining whether they endanger public health and welfare:

“At their core, these comments are not about whether commenters believe greenhouse gases may reasonably be anticipated to endanger public health or welfare, but rather about commenters' dissatisfaction with the decisions that Congress made regarding *the response* to any endangerment finding that EPA makes under CAA section 202(a). * * *

What these comments object to is that Congress has already made some decisions about next steps after a finding of endangerment, and the commenters are

displeased with the results. But if this is the case, commenters should take up their concerns with Congress, not EPA. EPA's charge is to issue new motor vehicle standards under CAA section 202(a) applicable to emissions of air pollutants that cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare. It is not to find that there is no endangerment in order to avoid issuing those standards, and dealing with any additional regulatory impact.

Indeed, commenters' argument would insert policy considerations into the endangerment decision, an approach already rejected by the Supreme Court. First, as discussed in Section I.B of these Findings, in *Massachusetts v. EPA*, the court clearly indicated that the Administrator's decision must be a “scientific judgment.” 549 U.S. at 534. She must base her decision about endangerment on the science, and not on policy considerations about the repercussions or impact of such a finding” 74 FR at 66515; December 15, 2009).

Thus, petitioners are wrong in their claim that either EPA statements in the Proposed Tailoring Rule, or comments received thereon, regarding potential implementation difficulties in the PSD or title V permitting programs are legally relevant at all, let alone of central relevance, to EPA's Endangerment Findings.⁴⁸ The agency's statements in the Findings that it “does not believe that the impact of regulation under the CAA as a whole * * * will lead to the panoply of adverse consequences that commenters predict,” and that “EPA has and will continue to take a measured approach to address greenhouse gas emissions” do not mean that EPA gave “credence and expression to one key negative impact” as one petitioner alleges. Ohio Coal Supp. at 15. These statements, which immediately follow EPA's explanation of how the Administrator must look at the science and not policy consideration, are merely EPA's response to the dire predictions submitted by commenters. EPA did not and could not consider such impacts in making its science based judgment on endangerment.

EPA further disagrees with the arguments that it must grant

⁴⁸ We note that EPA has addressed the concerns about the approach set forth in the Proposed Tailoring Rule raised by state permitting authorities. In response to the very comments raised by petitioners here, as well as other comments, EPA revised its approach for implementing its tailoring rule approach to allow for faster state adoption of the solution. Final Prevention of Significant Deterioration (PSD) and Title V Greenhouse Gas Tailoring Rule 75 FR at 31518, 31579–84 (June 3, 2010) (Final Tailoring Rule). Moreover, EPA also finalized applicability thresholds that are higher than those proposed, and otherwise refined the phase-in of permitting for GHGs to better accommodate the workload. *Id.* at 31523–25.

reconsideration and reopen the Findings because since the close of the comment period EPA has recognized that the Findings would lead to the LDVR, which triggers the PSD and title V requirements, which in turn would give rise to “absurd results” in the permitting provisions applicable to some stationary sources. The fact that the impacts from PSD and title V permitting may be absurd does not mean that EPA can reinterpret section 202(a) to allow the consideration of those absurd results, and then find no endangerment or avoid making a determination on endangerment.

What petitioners fail to analyze is how, given the overwhelming science supporting the endangerment finding (see above), EPA could decline to issue the Findings because of policy/implementation concerns unrelated to the science and unrelated to the question of whether there is endangerment, and not violate the Supreme Court’s decision in *Massachusetts v. EPA*. As discussed above, EPA disagrees with petitioners who argue that “*Massachusetts* requires EPA to carefully consider [the absurdity doctrine] implications for the Agency’s overall statutory interpretation.” Chamber at 13. The Supreme Court was clear that GHG fit within the definition of “air pollutant” under the CAA, and that when considering the question of endangerment the Administrator may consider only the science. EPA “must ground its reasons for action or inaction in the statute,” and the statutory endangerment provision in section 202(a) required that EPA’s “exercise of judgment must relate to whether an air pollutant ‘cause[s], or contribute[s] to, endangerment.’” This was a “direction to exercise discretion within defined statutory limits,” and the Court explicitly rejected EPA’s authority to exercise its judgment for policy reasons not related to “compl[iance] with this clear statutory command.”

Massachusetts at 532–533. Petitioners would have us ignore the clear mandate of the Court’s decision on the premise that if the case had been argued differently, the Court would have rendered a different opinion. EPA reasonably followed the instructions from the Supreme Court as provided in *Massachusetts*.

Even if EPA had the authority and could reconsider its statutory authority under CAA section 202(a) in light of the absurdity doctrine, rather than follow petitioners’ implied approach, EPA would follow the approach set out in the Final Tailoring Rule—a narrow solution that focuses on that part of the CAA where the absurdity originates.

EPA’s approach balances the goal of improving public health and the environment by tackling air pollution problems with the goal of avoiding absurd results.⁴⁹ Petitioners would apply the absurd results doctrine too broadly, undertaking a sweeping approach that negates any and all regulation of GHGs under the CAA in order to avoid problems that have arisen in specific programs. EPA’s targeted use of the absurd results doctrine in the Tailoring Rule is the better approach to reconciling all its obligations under the CAA. EPA has interpreted the statute as a whole, and interpreted it in a manner that does not allow difficulties in one program to nullify the various other Congressional provisions that may be relevant to climate change under the CAA.

Applying the Chevron two step test, EPA must, at Step 1, determine Congressional intent. *Chevron U.S.A. v. NRDC*, 467 U.S. 837 (1984). Under the absurd results doctrine “the literal meaning of statutory requirements should not be considered to indicate Congressional intent if that literal meaning would produce a result that is senseless or that is otherwise inconsistent with—and especially one that undermines—underlying congressional purpose.” Final Tailoring Rule, 75 FR at 31517. Looking at section 202(a) of the CAA, congressional intent appears clear, under *Chevron* Step 1, that Congress intended the Administrator to regulate emissions of air pollutants from new motor vehicles if the Administrator found that such emissions cause or contribute to air pollution which endangered public health or welfare. The Supreme Court stated that “[i]f EPA makes a finding of endangerment, the Clean Air Act requires the agency to regulate emissions of the deleterious pollutant from new motor vehicles.” *Massachusetts* at 533. Moreover, the

⁴⁹ In response to objections which are based in part on allegations that EPA must reconsider its final decision because new evidence allegedly shows that the LDVR will not get meaningful reductions, EPA has already stated in the final Findings that it does not need to find that any attendant regulations flowing from an endangerment finding would “fruitfully attack” or prevent at least a substantial part of the danger in order to find endangerment. 74 FR at 66507–08.

Moreover, contrary to one petitioner’s implied allegation, EPA did not consider the benefits resulting from stationary source emissions reductions when issuing the Findings, and the petitioner did not point to any evidence that EPA did base the Findings on such considerations. Finally, to the extent petitioners are arguing that EPA should reevaluate its approach to absurd results because there is little environment or public health benefit from the LDVR which followed the Findings, EPA disagrees. See Section IV.B responding to comments regarding NHTSA rules.

Supreme Court has held that when making the endangerment finding the Administrator must look only at the science. There are no absurd results in the specific actions under section 202(a) of either issuing an endangerment finding itself or in issuing standards applicable to GHG emissions from new motor vehicles. The absurd results stem from the contents of other statutory provisions, the PSD and Title V provisions discussed in the Tailoring Rule, not section 202(a). Even for those provisions, in the Final Tailoring Rule EPA specifically determined that the PSD and title V provisions indicate a clear congressional intent to cover at least the largest sources of GHGs under these programs. *Id.* at 31517. Taking all of these facts together, EPA’s approach to utilization of the absurdity doctrine gives the greatest effect to the various provisions of the CAA and the overall congressional intent under the CAA, by minimizing the scope of limitation on statutory provisions in the application of the absurd results doctrine.

As EPA discussed in the Tailoring Rule:

“[i]n determining and implementing congressional intent, it is important that the statutory provisions at issue be considered together—(1) The obligation to make a determination on endangerment and contribution under CAA section 202(a); (2) if affirmative endangerment/cause or contribute findings are made, the obligation to promulgate standards applicable to the emissions of any such air pollutant from new motor vehicles or new motor vehicle engines under CAA section 202(a); and (3) the PSD and title V applicability provisions. The most appropriate reading, and certainly a reasonable reading, is that we are required to take the action we have taken, that is to issue the findings, promulgate the LDVR, and promulgate the Tailoring Rule. Our approach gives effect to as much of Congress’s intent for each of these provisions, and the CAA as whole, as possible.

With respect to the endangerment/cause or contribute findings under CAA section 202(a), congressional intent is clear that, as we stated in making the Findings and the Supreme Court held in *Massachusetts v. EPA*, we are precluded from considering factors other than the science based factors relevant to determining the health and welfare effects of the air pollution in question. Accordingly, as discussed above, EPA determined that the Agency was precluded from deferring or foregoing the findings due to concern over impacts on stationary sources affected by PSD or title V requirements. See 74 FR at 66496, 66500–01 (“Taken as a whole, the Supreme Court’s decision clearly indicates that policy reasons do not justify the Administrator avoiding taking further action on the questions here.”); see also *Massachusetts v. EPA*, 549 U.S. at 533; see also (74 FR 66515–16, December 9, 2009) (The Administrator “must base her decision about endangerment on the science,

and not on the policy considerations about the repercussions or impact of such a finding.”). Moreover, as EPA also noted, “EPA has the ability to fashion a reasonable and common-sense approach to address greenhouse gas emissions and climate change. 74 FR at 66516.” (75 FR 31574, June 3, 2010)(footnote omitted).⁵⁰

The petitioners merely continue to disagree with EPA’s interpretation of the Supreme Court decision and question EPA’s ability to address permitting concerns, rather than provide anything new in their petitions on this topic.

To the extent the petitioners are requesting that EPA reconsider and defer or forego issuance of the Findings to avoid causing an absurd result from implementation of the separate PSD and title V programs until such time as EPA could fully implement these programs without an absurd result, underlying this claim is the assumption that this approach would allow EPA to avoid the “absurd results” that are discussed in the Tailoring Rule, which states:

“* * * there is no basis at this point to determine that streamlining will ultimately allow full compliance with the PSD and title V requirements. Rather, it is possible that EPA may conclude that none of the available streamlining techniques will allow all GHG sources at the statutory thresholds to comply with PSD and title V requirements in a manner that does not impose undue costs on the sources or undue administrative burdens on the permitting authorities. Under these circumstances, EPA may then permanently exclude GHG source categories from PSD or title V applicability under the absurd results doctrine. Moreover, it may well take many years before EPA is in a position to come to a conclusion about the extent to which streamlining will be effective and therefore be able to come to a conclusion as to whether any source categories should be permanently excluded from PSD or title V applicability. In our rulemaking today, we describe what actions we expect to take in the first 6 years after PSD and title V are triggered for GHG sources, and we may well be in a situation in which we continue to evaluate streamlining measures and PSD and title V applicability to GHG sources after this 6-year period.

Accordingly, deferring the endangerment/cause or contribute findings and LDVR until such time that PSD and title V streamlining would allow full implementation of these programs at the statutory limits would serve only to delay the benefits of the LDVR, as well as the benefits that come from phasing in implementation of the PSD program to cover larger sources first. It would rely on an assumption that is unfounded at this point, that is, that such full compliance will be required at some point in the future. Delaying

the emissions benefits of the LDVR and the related emissions benefits from partial implementation of the PSD program fails to implement Congress’ intent that the endangerment/cause or contribute findings “shall” lead to emissions standards for new motor vehicles contributing to the endangerment, and related emissions controls for the same air pollutant under the PSD program. EPA need not determine at this time what approach would be appropriate if there was a determination that full compliance with PSD and title V would in fact occur at some point in the future. In this case, absent such a determination, it would be improper to rely on speculation of such a future possibility as a basis under section 202(a) to defer or forego issuance of the LDVR on the grounds that EPA should defer or forego the LDVR to avoid causing an absurd result. Likewise there is no basis to defer proceeding at this time with the streamlining of the PSD and title V programs.

With respect to the PSD and title V applicability requirements, as we discuss elsewhere, we believe that Congress expressed a clear intent to apply PSD and title V to GHG sources and that the phase-in approach incorporated in the Tailoring Rule is fully appropriate. Proceeding now with the endangerment/contribution findings and LDVR, even if phasing-in of the PSD and title V programs is required, is consistent with our interpretation of the PSD and title V applicability requirements. Delaying the endangerment/contribution findings or LDVR, and thereby delaying the triggering of PSD and title V requirements for GHG sources, would lead to the loss of a practicable opportunity to implement the PSD and title V requirements in important part, and thereby lead to the loss of important benefits. As discussed elsewhere, promulgating the LDVR and applying the PSD and title V requirements to the largest GHG sources, as we do in this Tailoring Rule, is practicable because the sources that would be affected by the initial implementation steps we promulgate in this rule are able to bear the costs and the permitting authorities are able to bear the associated administrative burdens. Promulgating the LDVR now provides important advantages because the sources that would be affected by the initial steps are responsible for most of the GHG emissions from stationary sources.

It should also be noted that as discussed elsewhere in this rulemaking, our ability to develop appropriate streamlining techniques for PSD and title V requirements is best done within the context of actual implementation of the permitting programs, and not in isolation of them. That is, because the great majority of GHG sources have not been subject to PSD and title V requirements, we will need to rely on the early experience in implementing the permitting requirements for the very large sources that initially will be subject to those requirements in order to develop streamlining techniques for smaller sources. It is the real world experience gained from this initial phase that will allow EPA to develop any further modifications that might be necessary. This would not and could not occur if the LDVR were delayed indefinitely or permanently, so that PSD and

title V requirements were not triggered. It is unrealistic to expect that delaying action until a future tailoring rule could resolve all of the problems identified in this rulemaking, absent any real world implementation experience.

At its core, commenters’ argument is that EPA should delay (if not forego altogether) doing anything to address GHG emissions and the problems they cause until it can do so in a way that does not cause any implementation challenges, even if that delay results in continued endangerment to public health and welfare. EPA does not take such a myopic view of its duties and responsibilities under the CAA. Congress wrote the CAA to, among other things, promote the public health and welfare and the productive capacity of the population. CAA § 101(b)(1). EPA’s path forward does just this. Thus, proceeding with the endangerment/cause or contribute findings, the LDVR, and with PSD and title V through the phase-in approach of the Tailoring Rule maximizes the ability of EPA to achieve the Congressional goals underlying CAA sections 202(a) and the PSD and title V provisions, and the overarching CAA goal of protecting public health and welfare. Congress called for EPA (1) to determine whether emissions from new motor vehicles contribute to air pollution that endangers, (2) if that the determination is affirmative, to issue emissions standards for new motor vehicles to address the endangerment, and (3) to implement the PSD and Title V program to address similar emissions in their permitting program as another tool to address the air pollutant at issue. Delaying both the LDVR and PSD/title V implementation, as commenters have called for, would run directly counter to these Congressional expectations. Commenters’ calls for deferral or foregoing of the findings or LDVR are generally phrased in a conclusory fashion, and do not demonstrate how EPA could take the required CAA actions concerning GHGs while remaining within the requirements of each of the various CAA provisions, and achieving the overall goals of the CAA. As such the comments do not provide a valid basis for the deferral of agency action they suggest.” (75 FR 31575–56; June 3, 2010).

As explained above, EPA is resolving the absurdity caused by the statutory thresholds in the PSD and title V permitting programs not by avoiding an endangerment finding or avoiding all regulation under the CAA, but rather by interpreting the statute in a way that gives effect to the greatest extent possible to both section 202(a) and the applicable permitting provisions. This gives the greatest effect possible to the congressional intent about addressing air pollutant problems that endanger public health and welfare, while also focusing the permitting programs, at least initially, on large stationary sources. EPA’s targeted use of the absurd results doctrine in the Tailoring Rule is a reasonable approach to reconcile the various statutory obligations under the CAA at issue here.

⁵⁰ This reasonable and common-sense approach includes the kind of step by step approach that includes regulation of GHG emissions from new motor vehicles, as described by Justice Stevens in *Massachusetts*, when discussing the issue of standing. *Id.* at 524.

EPA also disagrees with petitioners who argue either implicitly or explicitly that EPA has admitted, through its invocation of the absurd results doctrine in the Proposed Tailoring Rule, that it cannot regulate GHGs under the CAA without violating the statute. While, in the Tailoring Rule, EPA has noted that applying the statutory thresholds in the PSD and title V programs to greenhouse gases immediately for all sources would present problems, and may indeed lead to absurd results even in the long run, EPA did not and does not take the position that all regulation of GHGs under the CAA leads to absurd results or is illegal. In fact, just the opposite is true. EPA has issued reasonable, effective GHG emissions standards for light duty vehicles, and has announced plans for further GHG emissions standards for later model year light-duty vehicles. EPA also plans to propose the same for heavy-duty motor vehicles. Moreover, by applying, *inter alia*, the doctrines of absurd results and administrative necessity, EPA has been able to avoid the absurd results that could arise from applying the statutory thresholds for PSD and title V to greenhouse gases.⁵¹ The concept behind the absurd results doctrine is that an agency can (if not must) ignore the literal meaning of a statute in order to effectuate congressional intent. That is exactly what EPA's approach does—ignore only the statutory thresholds for PSD and title V in order to effectuate congressional intent under the CAA as a whole. EPA's reliance on one or more doctrines of administrative law when interpreting the statute is not evidence of the illegality of EPA's actions; rather it is evidence of the reasonable approach EPA took to interpreting and implementing the statute.

Finally, EPA is also denying the petitions because, while the Tailoring Rule was proposed after the close of the comment period for the Findings, EPA discussed the impact of applying the PSD and title V statutory thresholds to GHGs, and the potential need to tailor those programs as appropriate, in the July 2008 ANPR. 73 FR 44354, 44497–514, 44503 (“we have identified two

legal doctrines that may provide EPA with discretion to tailor the PSD program to GHGs: Absurd results and administrative necessity.”), 44512 (discussing same legal theories in context of title V). Indeed, EPA received comments from some of the same entities that are petitioning for reconsideration now regarding the Agency's position about its ability to craft a reasonable approach to addressing GHGs under the CAA, including the CAA permitting programs. See, e.g., Comments submitted by Marlo Lewis for the Competitive Enterprise Institute (EPA–HQ–OAR–2009–0171–2898.1). Thus, while EPA itself may have elaborated regarding the potential for absurd results from GHG permitting at the statutory thresholds in the Proposed Tailoring Rule, the issue was not raised for the first time in the Tailoring Rule; it had already been raised in the ANPR, and there was nothing preventing petitioners from commenting on the issue in their comments on the proposed Findings (as indeed some did). Commenters on the proposed Findings also argued that the Supreme Court was unaware of the impacts of the permitting programs when deciding *Massachusetts*. RTC Volume 11 at 5. Thus, objections based on the need to apply the absurd results doctrine to the PSD and title V programs, and on arguments related to how EPA defended its actions in *Massachusetts*, could have been (and indeed were) raised during the comment period on the Findings and are not appropriately raised in petitions for reconsideration.

B. NHTSA Rule

The Chamber of Commerce raised objections based on the authority of the National Highway Traffic Safety Administration (NHTSA) to issue Corporate Average Fuel Economy (CAFE) standards for new motor vehicles. Specifically, the Chamber argued that the federal government must choose between two alternative regulatory approaches: Seeking to regulate GHG emissions using NHTSA's authority, under EPCA as revised by EISA or, alternatively, regulating such emissions on authority of Title II of the CAA. According to the Chamber, NHTSA has recently acknowledged it has adequate legal authority under EPCA and EISA to regulate greenhouse gas emissions, independent from EPA's authority under CAA section 202(a), therefore EPA must reconsider the Endangerment Finding because it cannot claim to generate the public health benefits from CAA mobile source GHG emissions reductions. The

Chamber argues that according to EPA, the Endangerment Finding, standing alone, produces no current public health or welfare benefits but will instead produce such benefits in the future, but only if it effectively serves as a precondition for the regulation of GHG emissions from new motor vehicles or some other category of emission sources. Thus, the Chamber concludes, EPA has justified the Endangerment Finding as a means to the end of new motor vehicle regulation.

The Chamber claims that this core rationale for EPA's Endangerment Finding and regulatory program can no longer bear scrutiny. It argues that if EPA affirmatively wishes to pursue an Endangerment Finding to regulate emissions from new motor vehicles, it must explain what it can add to a NHTSA-only rulemaking. According to the Chamber, EPA may not rely on a presumed need for motor vehicle regulations that could be accomplished through NHTSA regulations alone. (Chamber, 19–23)

Petitioner claims that EPA issued and justified the Endangerment Finding based on the need for emissions reductions from EPA regulation of new motor vehicles, and the expectation that such EPA regulation would achieve the expected emissions reductions. That argument mischaracterizes EPA's position.

Consistent with the statutory language, legislative history and Supreme Court case law, EPA determined whether atmospheric concentrations of greenhouse gases are reasonably anticipated to endanger public health or welfare, and based that determination on the scientific and other evidence relevant to the issues of endangerment. As EPA made clear, CAA section 202(a) limited the issues EPA could consider in making a determination concerning endangerment, and they did not include consideration of the degree of reductions that would reasonably be achieved by regulations to control emissions from new motor vehicles. EPA clearly stated that:

“As the Supreme Court made clear in *Massachusetts v. EPA*, EPA's judgment in making the endangerment and contribution findings is constrained by the statute, and EPA is to decide these issues based solely on the scientific and other evidence relevant to that decision. EPA may not “rest[] on reasoning divorced from the statutory text,” and instead EPA's exercise of judgment must relate to whether an air pollutant causes or contributes to air pollution that endangers. *Massachusetts v. EPA*, 549 U.S. at 532. As the Supreme Court noted, EPA must “exercise discretion within defined statutory limits.” *Id.* at 533. EPA's belief one way or

⁵¹ Contrary to one petitioner's argument, EPA did not craft the Tailoring Rule in response to the global nature of greenhouse gas concentrations and climate change. Rather, it is the much higher amounts at which greenhouse gases are emitted by stationary sources, compared to existing criteria and other regulated air pollutants, that necessitated EPA's reasonable approach to permitting. The absurdity that EPA was trying to avoid was permitting stationary sources much smaller than Congress intended when writing the permitting provisions of the CAA. The global nature of greenhouse gases and climate change was not the reason for the Tailoring Rule.

the other regarding whether regulation of greenhouse gases from new motor vehicles would be “effective” is irrelevant in making the endangerment and contribution decisions before EPA. *Id.* Instead “[t]he statutory question is whether sufficient information exists to make an endangerment finding” *Id.* at 534.

The effectiveness of a potential future control strategy is not relevant to deciding whether air pollution levels in the atmosphere endanger. It is also not relevant to deciding whether emissions of greenhouse gases from new motor vehicles contribute to such air pollution. Commenters argue that Congress implicitly imposed a third requirement, that the future control strategy have a certain degree of effectiveness in reducing the endangerment before EPA could make the affirmative findings that would authorize such regulation. There is no statutory text that supports such an interpretation, and the Supreme Court makes it clear that EPA has no discretion to read this kind of additional factor into CAA section 202(a)’s endangerment and contribution criteria. In fact, the Supreme Court rejected similar arguments that EPA had the discretion to consider various other factors besides endangerment and contribution in deciding whether to deny a petition. *Massachusetts v. EPA*, 549 U.S. at 532–35.” (74 FR 66496, 66507–8; December 15, 2009).

This excerpt was in response to comments arguing that EPA should take into account the emissions impacts of EPA’s then upcoming rule to control emissions of greenhouse gases from light-duty vehicles and trucks, and consider that the CAFE standards issued by NHTSA would effectively achieve the same reductions. *Id.* at 66501, 66507. Just as the effectiveness of future motor vehicle regulations was not relevant to determining endangerment, EPA made it clear that CAA section 202(a) did not allow EPA to consider issues such as future adaptation and mitigation, which reflected how society responded to the issue of endangerment, not whether endangerment existed. *Id.* at 66512–514.

Thus, it is clear that EPA did not justify or base its Endangerment Finding on either the need for emissions reductions from EPA regulations of new motor vehicles, or the expectation that such an EPA regulation would achieve emissions reductions. EPA rejected suggestions during the rulemaking that EPA refrain from issuing and Endangerment Finding because NHTSA has the authority to issue CAFE standards that also reduce greenhouse gases, as discussed above. The Chamber is raising basically the same issue raised in the rulemaking, and has presented no reason that would support any different response. EPA is rejecting Chamber’s request for the same reasons it rejected

these same kinds of requests in the rulemaking.

It is also clear that it was eminently practicable for the Chamber to raise this issue in the comment period. As described above, various commenters pointed to NHTSA’s separate authority, and argued that NHTSA would effectively achieve the same reductions as EPA, undermining the basis for EPA’s Endangerment Finding. *Id.* at 66507. Also see 66544, in the context of the Contribution Finding. The Chamber raises the same kind of objection here, and could have raised it during the comment period. While they point to a subsequent statement by NHTSA indicating that NHTSA’s statutory authority is separate from EPA’s, that is not new or different information concerning NHTSA’s authority and does not change the nature of the Chamber’s objection. Their failure to raise their objection in a timely manner is another reason to reject their request to reconsider on these grounds.

As part of their argument, the Chamber claims that EPA must explain what it can add to a NHTSA-only rulemaking. This is one part of the argument raised above, and is rejected for the same reasons. As with the arguments discussed above, the Chamber could have raised this argument during the comment period, and the failure to do so is another reason to reject their request to reconsider on these grounds.

In any case, EPA has explained in detail how the recently issued regulations under CAA section 202(a) to control emission of greenhouse gases from light-duty vehicles and trucks differ from NHTSA’s CAFE program for the same vehicles, and why it was important for EPA to issue its rule. In the final rule issuing greenhouse gas emissions standards for new motor vehicles, EPA responded to comments that it should delay issuance of the motor vehicle standards until a later time, to avoid concerns over stationary source permitting impacts. EPA stated:

“[The Supreme Court in *Massachusetts*] stated that under section 202(a), “[i]f EPA makes [the endangerment and cause or contribute findings], the Clean Air Act requires the agency to regulate emissions of the deleterious pollutant.” 549 U.S. at 534. As discussed above, EPA has made the two findings on contribution and endangerment. 74 FR 66496 (December 15, 2009). Thus, EPA is required to issue standards applicable to emissions of this air pollutant from new motor vehicles.

The Court properly noted that EPA retained “significant latitude” as to the “timing * * * and coordination of its regulations with those of other agencies” (*id.*). However it has now been nearly three

years since the Court issued its opinion, and the time for delay has passed. In the absence of these final standards, there would be three separate Federal and State regimes independently regulating light-duty vehicles to increase fuel economy and reduce GHG emissions: NHTSA’s CAFE standards, EPA’s GHG standards, and the GHG standards applicable in California and other states adopting the California standards. This joint EPA–NHTSA program will allow automakers to meet all of these requirements with a single national fleet because California has indicated that it will accept compliance with EPA’s GHG standards as compliance with California’s GHG standards. 74 FR at 49460. California has not indicated that it would accept NHTSA’s CAFE standards by themselves. Without EPA’s vehicle GHG standards, the states will not offer the Federal program as an alternative compliance option to automakers and the benefits of a harmonized national program will be lost. California and several other states have expressed strong concern that, without comparable Federal vehicle GHG standards, the states will not offer the Federal program as an alternative compliance option to automakers. Letter dated February 23, 2010 from Commissioners of California, Maine, New Mexico, Oregon and Washington to Senators Harry Reid and Mitch McConnell (Docket EPA–HQ–OAR–2009–0472–11400). The automobile industry also strongly supports issuance of these rules to allow implementation of the national program and avoid “a myriad of problems for the auto industry in terms of product planning, vehicle distribution, adverse economic impacts and, most importantly, adverse consequences for their dealers and customers.” Letter dated March 17, 2010 from Alliance of Automobile Manufacturers to Senators Harry Reid and Mitch McConnell, and Representatives Nancy Pelosi and John Boehner (Docket EPA–HQ–OAR–2009–0472–11368). Thus, without EPA’s GHG standards as part of a Federal harmonized program, important GHG reductions as well as benefits to the automakers and to consumers would be lost. In addition, delaying the rule would impose significant burdens and uncertainty on automakers, who are already well into planning for production of MY 2012 vehicles, relying on the ability to produce a single national fleet. Delaying the issuance of this final rule would very seriously disrupt the industry’s plans” (75 FR 25314, 25402; May 7, 2010).

EPA also noted that the greenhouse gas standards issued by EPA achieved greater overall reductions in greenhouse gases than NHTSA’s CAFE standards. *Id.* at n.165, 25402; also see 25397, 25549–50. Thus, EPA has explained in full the reasons for refusing to delay issuance of EPA’s motor vehicle emissions standards, and what EPA’s rule adds to NHTSA’s CAFE rule. As noted above, these issues are not relevant to the issues EPA considers in making a determination on endangerment under CAA section 202(a).

C. Other Issues

1. Effects of the Findings and Subsequent Rulemakings on States and Businesses

Many of the petitioners provide detailed information regarding the impact that they allege would flow from the Findings; these discussions are in addition to arguments based on the Proposed Tailoring Rule (see Section IV.A of this Notice for the response to the arguments based on the Proposed Tailoring Rule). For example, the State of Texas, in addition to providing information regarding efforts the State has made to address GHGs, details harm it predicted could occur to the State through allegedly adverse impacts to its farming and ranching, mineral interest revenue stream, and oil and gas sector. Texas at 5–7, 32–34. The State also discusses what it describes as the “fallout” from the Findings. *Id.* at 34–38. More specifically, the State of Texas discusses resolutions and bills that have been introduced in the U.S. House of Representatives and the U.S. Senate, comments from the Small Business Administration’s Office of Advocacy on the Proposed Tailoring Rule,⁵² and various inquiries into, or statements about, the CRU e-mails and IPCC.

The State of Virginia, while not providing any additional information regarding the alleged impacts of the Findings, states that “EPA’s remote finding of endangerment to health and welfare fail to consider and properly weigh the offsetting harms to health and welfare necessarily flowing from economically destructive regulation.” Virginia at 3.

The petitioners’ information regarding the impact to petitioners and others often follows sections of the petitions in which petitioners raise allegedly new concerns with the science underlying the Findings. The information regarding the impact from the Findings is most often provided in order to emphasize to EPA the necessity of reconsidering the Findings based on those earlier concerns.⁵³ *See, e.g.*, Texas at 35 (“In light of these * * * concerns * * * the Administrator’s improper handling of the scientific assessment process takes on an even greater meaning.”); Letter from WV Coal Assn. at 1 (“EPA’s findings would have a grave impact on

our industry and the thousands of West Virginians who depend on the production and use of our high quality coal everyday * * *. This makes it all the more important that EPA suspend its decision and reconsider it in light of these important new developments.”).

The objections based either explicitly or implicitly on EPA’s decision to not consider the impacts of greenhouse gas regulations when making the Findings could have been, and indeed were, raised during the public comment period on the Findings. Thus, they are not properly raised in CAA section 307(d) petition for reconsideration and are therefore denied.

Moreover, as discussed elsewhere in this Decision and supporting material, this information is essentially irrelevant to the scientific based questions before EPA when making the endangerment and contribution findings. EPA already explained in the Findings how the potential impacts from the regulations that may follow an endangerment finding are not proper considerations when determining whether GHGs may reasonably be anticipated to endanger public health or welfare. *See generally*, 74 FR at 66515–16; *see also id.* at 66515 (The Administrator “must base her decision about endangerment on the science, and not on policy considerations about the repercussions or impact of such a finding.”); *id.* at 66516 (“Therefore, it is reasonable to interpret the endangerment test as not requiring the consideration of the impacts of implementing the statute in the event of an endangerment finding as part of the endangerment finding itself.”).

Finally, as detailed elsewhere in this Decision and RTP document, the CRU e-mails and other scientific information provided by the petitioners do not call into question the underlying science, EPA’s reliance on it, or the Administrator’s final determination.

2. A Formal Rulemaking Process Is Not Required

One petitioner discusses why EPA should not only reconsider the Findings, but also utilize the formal rulemaking process in the reconsideration proceedings. Peabody Energy at IX–9 to IX–18. Essentially, the petitioner believes that the questions raised by the CRU e-mails and errors in IPCC AR4 are so serious that EPA’s responsibilities to address them can be discharged only through granting reconsideration, and undertaking a formal rulemaking process. More specifically, the petitioner states that “[a]n on-the-record proceeding is necessary to rectify the substantial flaws

in the process that EPA has employed, flaws that stem from the abuses infecting the studies on which the Endangerment Finding is principally based.” Peabody Energy at IX–9.

In support of its argument, petitioner first notes that while EPA may not be required by the CAA to undertake an on-the-record proceeding, nothing prohibits EPA from undertaking more process than is required by statute. *Id.* at IX–9 to IX–10. The petitioner then argues that case law and “other authoritative guidance,” specifically guidance from the Administrative Conference of the United States (ACUS), “make clear than an evidentiary hearing” on the petitions for reconsideration is warranted. *Id.* at IX–10. The petitioner contends that a formal evidentiary hearing will fix EPA’s record, which they claim is “wholly inadequate” and cannot justify finding endangerment to public health.⁵⁴ More specifically, they claim that a “responsive thrust and parry” about the science underlying the Administrator’s decision, including “secondary sources” such as the IPCC, should occur and that the informal rulemaking proceeding EPA undertook does not allow for this. Peabody Energy at IX–16.

Comments suggesting that EPA undertake a formal rulemaking process, not only could have been raised, but were raised, during the comment period for the Findings. 74 FR at 66504–05, 66510–12. Thus, they are not appropriately raised in petitions for reconsideration. Please see the above portions of the Findings, RTC Volume 1, and Section III of this Decision for further discussion on why EPA’s denial of the request for formal hearing in the Findings, and the agency’s continued reliance on the assessment reports, is reasonable.

To the extent that the petitioners are re-raising these comments in light of the CRU e-mails and IPCC developments, and asking for EPA to reconsider its prior denial of the request for a formal rulemaking hearing, for the reasons explained elsewhere in this Decision and supporting materials, these materials do not necessitate EPA granting reconsideration, let alone initiating the exceedingly rare process of a formal, on-the-record rulemaking. When all is said and done, the CRU e-mails and IPCC errors do not call into question the science supporting the Administrator’s decision. They surely do not rise to the level of “extremely

⁵² The State of Texas stated that this letter was provided to the endangerment docket (EPA–HQ–OAR–2009–0171), but it was actually submitted to the docket for the Proposed Tailoring Rule (EPA–HQ–OAR–2009–0571).

⁵³ Petitioners also provide this information in the context of requesting an administrative stay of the Findings from EPA. *See* Section II for a discussion of EPA’s denial of these stay requests.

⁵⁴ EPA responds to the argument regarding the public health finding in section IV.B.I of the Findings and Volume 5 of the RTC document.

compelling circumstances” that petitioner argues would justify a court dictating that EPA undertake formal rulemaking procedures. Peabody Energy at IX–10.

Petitioner argues that while EPA is not required by the CAA to follow a formal rulemaking process, EPA has the authority to convene such a hearing and nothing in the CAA should be read to “limit EPA’s discretion in deciding whether to do so.” Peabody Energy at IX–9, n. 494. The petition also notes that EPA is equipped to undertake such a hearing, citing the existing procedures for adjudications, 40 CFR 22.3(a). While EPA may have the discretion to provide more process than the minimum required by CAA section 307(d), EPA notes that the petition does not discuss how a formal on-the-record hearing process would fit within the informal rulemaking proceedings mandated by the CAA. See 74 FR at 66505 (noting that original request also did not discuss how a formal hearing would fit with CAA requirements). Nor does it discuss how the 40 CFR part 22 regulations, which are entitled “Consolidated Rules of Practice Governing the Administrative Assessment of Civil Penalties and Revocation/Termination or Suspension of Permits” and cover administrative adjudicatory proceedings for specifically delineated civil penalty or permit actions, would authorize the type of hearing petitioner suggests, or even how they would work assuming EPA chose to apply them as suggested by petitioner.

The cases cited by petitioner stand for the unsurprising proposition that some circumstances justify more or different procedures than others. But they do not, as petitioner alleges, lead to the inevitable conclusion that the only reasonable recourse for EPA is to undertake a formal rulemaking process.⁵⁵ Indeed, that would be a

⁵⁵ The extremely compelling circumstances found by courts in the cases cited by petitioners do not exist here. See *People of the State of Illinois v. United States*, 666 F.2d 1066, 1082–83 (7th Cir. 1981) (court relied upon a combination of unique factors including that the Interstate Commerce Commission had allowed cross-examination on some information in an adjudicatory proceeding, but not other similar information, and the cross-examination had been found to be “critical to achieving an accurate determination of the facts.”); *National Wildlife Federation v. Marsh*, 721 F.2d 767, (11th Cir. 1983) (the court merely required the Army Corps of Engineers to follow its own longstanding internal procedures when issuing a permit). EPA also notes that two of the cases the petitioner cites for the proposition that “cross examination is the most effective way to ascertain the truth,” Peabody at IX–15, are criminal cases, therefore it is not surprising that cross-examination was at issue. The third, discussed above, involved a decision in which the agency had already decided to allow cross-examination. *People*, 666 at 1083.

departure “from the very basic tenet of administrative law that agencies should be free to fashion their own rules of procedure.” *Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 544 (1978). In *Vermont Yankee* the Supreme Court rejected an argument similar to that being made by petitioner here—that the issues before the agency were so complex and important that they necessitated more process, including cross-examination, even if such procedures were beyond the minimum required. *Id.* at 539–49. Also see *Kennecott*, 684 F.2d at 1020 fn 33.

To the extent that petitioner argues that EPA’s record is inadequate if it does not include the “thrust and parry” of a formal rulemaking hearing, with cross examination, EPA disagrees. Congress clearly indicated that the robust informal rulemaking procedures of CAA section 307(d) are appropriate for the myriad complex issues that EPA must address when issuing particular CAA rules. Nothing that petitioners have provided call into question EPA’s decision to follow the clear direction provided in section 307(d).

Indeed, the robust informal rulemaking requirements of section 307(d) of the CAA ensure adequate and appropriate notice and comment for CAA decisions. See generally 74 FR 66500–05 (discussing the public involvement in development of the Findings, including EPA’s careful review and response to more than 380,000 public comments). Moreover, the section 307(d) reconsideration process provides ample opportunity for petitioners, and any other interested party, to submit to EPA for consideration new information which they believe is of central relevance to the Administrator’s final decision, and hence necessitates reconsideration of that decision. Other than continuing to disagree with EPA’s denial of the original request for a formal rulemaking, and continuing to state its opinion that the science and regulatory impact from an endangerment finding demands more process, petitioner has not demonstrated why the clearly applicable procedures of section 307(d) are inadequate, let alone why only the rarely-used formal rulemaking process is the only reasonable path forward. Petitioners have submitted over 500 pages of reconsideration petitions, as well as attachments consisting of hundreds of pages that contain information including dozens of studies, more than 300 pages of computer code, and more than 1000 e-mails. Peabody Energy and other petitioners have had a full opportunity, both in the underlying rulemaking and in the reconsideration

process, to submit whatever information or evidence they want concerning the variety of scientific and other issues of concern to them, such as those identified at Peabody IX–12. EPA’s lengthy and detailed Denial, including this document and the RTP document, carefully examines each objection raised and explains why each objection is untimely and/or not of central relevance. The CAA reconsideration process provides ample opportunity for interested parties to present new information to EPA, and for EPA to examine that information. Petitioner has not identified what cross examination it thinks is required to “ensure that results reached by EPA reflect scientific truths”. For example, do they envision cross examination of all of the authors of the thousands of studies discussed in the rulemaking, or discussed in an assessment report? Cross examination of every author and other participant in an assessment report? Cross examination of agency scientists? And for all of these, on what subjects and issues? The administrative record includes the assessment reports and their integration of the science within areas of climate research and across various areas of climate research, as well as EPA’s TSD and additional reports and studies provided by commenters. The proposed and final Findings also included the Administrator’s judgments and conclusions on all of this evidence. Petitioners have failed to explain what facts they would like cross examination on, what witnesses they envision cross examining, and how any such examination would add in any way, much less a practical way, to the ability they already have, through submission of comments and petitions to reconsider, to attack and contest at length any and all of these parts of the informal rulemaking record. They have failed to demonstrate how their broad, general assertions of a better process would actually work as a practical way to better ensure the scientific integrity of the record before the Agency. It is quite reasonable for EPA to rely on the robust and in-depth informal rulemaking procedures followed in this rulemaking, as mandated by Congress, rather than embark on the rarely-used formal rulemaking pathway.

As discussed in the final Findings, the ACUS guidelines are non-binding recommendations regarding “important circumstances tending to suggest the desirability of such procedural devices”. 1 U.S.C. 305.76–3(1). EPA notes that the ACUS recommendations cited by petitioner are not specifically for the formal rulemaking proceedings

suggested by petitioner. Rather, they are more general, for “[h]earing argument and other oral presentation, when the presiding agency official or officials may ask questions, including questions submitted by interested persons.” 1 U.S.C. 305.76–3(1)(f). The CAA requires a hearing and opportunity for oral presentation, CAA section 307(d)(5), and EPA held two hearings during which interested parties could present their arguments and information and EPA could ask questions. Thus, EPA has already undertaken procedures similar to those recommended by the ACUS.

Last, part of the recommendation of the ACUS not raised by petitioner is the following:

An agency should employ any of the devices specified in paragraph 1 or permit cross-examination only to the extent that it believes that the anticipated costs (including those related to increasing the time involved and the deployment of additional agency resources) are offset by anticipated gains in the quality of the rule and the extent to which the rulemaking procedure will be perceived as having been fair.

1 U.S.C. 305.76–3(3).

For all the reasons stated above, in the final Findings, and elsewhere in this document and supporting material, EPA does not believe that the potential for gains in the quality of the Administrator’s decision, if any, would offset the costs, both in terms of agency resources and delay. Moreover, the section 307(d) rulemaking process is quite fair, providing adequate opportunity for everyone, and not just parties who could afford to participate in a formal hearing, to present their views. Contrary to petitioner’s argument, it resulted in a record that is both scientifically sound and adequate.

For all the foregoing reasons, the request to reconsider its prior decision and undertake a formal rulemaking, evidentiary hearing process, is denied.

3. Discretion in Making an Endangerment Finding

Peabody Energy argues that whatever discretion EPA may have in making an Endangerment Finding, it must justify and defend the specific findings of endangerment it actually made. More specifically, Peabody Energy argues that EPA did not assess the danger as low risk/high magnitude. It found instead both a high risk and high magnitude of harm, citing the following quotes from the Findings—“[t]he scientific evidence is compelling that elevated concentrations of heat-trapping greenhouse gases are the root cause of recently observed climate change” and “[m]ost of the observed increase in global average temperatures since the

mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations,” with “very likely” defined as 90–99% probability. Thus, they conclude, EPA must now defend its high risk/high harm conclusion, even if arguing it had discretion to make a lower finding of endangerment.

Peabody Energy argues that this distinction between the Endangerment Finding that EPA might be authorized to make and the Endangerment Finding it actually made is crucial in light of the CRU material. Peabody contends that even if EPA might still be able to make an Endangerment Finding of some kind (a fact that Peabody does not concede), that would not justify the Endangerment Finding that EPA actually made and would not form a sufficient basis to allow EPA to deny the petitions for reconsideration. Peabody argues that the regulation that EPA ultimately proposes must be guided by the nature and extent of the endangerment that EPA has found, because a high risk/high magnitude endangerment finding might justify one level of regulation, while a different finding might justify a different level. Thus, Peabody Energy claims the question that EPA must answer at the endangerment phase is not just “endangerment, yes or no?,” but specifically what type of endangerment. In that context, Peabody Energy argues that the revelations in the CRU material mean that EPA must reconsider its Endangerment Finding no matter what level of legal discretion the Agency has. Peabody Energy at IX–6 to 9.

Peabody Energy vastly oversimplifies the basis for EPA’s Endangerment Finding, characterizing it as a simple “high risk/high magnitude” decision. With respect to existence of climate changes and attribution to anthropogenic emissions of greenhouse gases, the Administrator concluded that:

the scientific evidence linking human emissions and resulting elevated atmospheric concentrations of the six well-mixed greenhouse gases to observed global and regional temperature increases and other climate changes to be sufficiently robust and compelling.

74 FR at 66523.

Based on this, the Administrator considered a wide variety of categories of public health and welfare that could be affected by the climate changes. The Administrator:

considered the state of the science on how human emissions and the resulting elevated atmospheric concentrations of well mixed greenhouse gases may affect each of the major risk categories, i.e., those that are described in the TSD, which include human health, air quality, food production and agriculture, forestry, water resources, sea

level rise and coastal areas, the energy sector, infrastructure and settlements, and ecosystems and wildlife. The Administrator understands that the nature and potential severity of impacts can vary across these different elements of public health and welfare, and that they can vary by region, as well as over time.

Id at 66509.

For each of these categories the Administrator took into account the varying degree of certainty of an impact as well as the potential magnitude of an impact. She considered both beneficial as well as adverse impacts. Id at 66524–537. There was no simple “high risk/high magnitude” paradigm. Instead, the Administrator was aware that:

because human-induced climate change has the potential to be far reaching and multi-dimensional, not all risks and potential impacts can be characterized with a uniform level of quantification or understanding, nor can they be characterized with uniform metrics. Given this variety in not only the nature and potential magnitude of risks and impacts, but also in our ability to characterize, quantify and project into the future such impacts, the Administrator must use her judgment to weigh the threat in each of the risk categories, weigh the potential benefits where relevant, and ultimately judge whether these risks and benefits, when viewed in total, are judged to be endangerment to public health and/or welfare.

Id at 66523–24.

Instead of the simple approach described by Peabody Energy, the Administrator properly exercised her judgment by taking into consideration the complexity and breadth of the range of risks and harms presented by the evidence.

In this context, Peabody Energy and other petitioners focus their arguments and claims almost exclusively on the question of the existence of climate change and its attribution to anthropogenic emissions of greenhouse gases. After considering their claims, EPA is denying the petitions to reconsider for the reasons described above. They have not provided substantial support for the argument that the Endangerment Finding should be revised, and EPA continues to find that the “scientific evidence linking human emissions and resulting elevated atmospheric concentrations of the six well-mixed greenhouse gases to observed global and regional temperature increases and other climate changes to be sufficiently robust and compelling.”

In sum, contrary to Peabody Energy’s assertion EPA did not employ a simplified “high risk/high magnitude” paradigm in making the Endangerment Finding. Instead the Administrator

carefully and comprehensively considered the recognized broad range of varying risks and harms across multiple sectors of public health and welfare. In addition, EPA is not now changing its Endangerment Finding or using its discretion under section 202(a)

to base it on a “lower finding of endangerment”.

V. Conclusion

For all of the reasons discussed above and in the accompanying RTP document, the petitions to reconsider the Endangerment and Cause or Contribute Findings for Greenhouse

Gases under Section 202(a) of the Clean Air Act are denied, as are the petitions for an administrative stay.

Dated: July 29, 2010.

Lisa P. Jackson,

Administrator.

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