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The Heartland Institute submits the following comments in response to the United States Environmental Protection Agency (“EPA”) Notice of Rulemaking entitled Proposed Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act. For the reasons discussed below, for EPA Administrator Lisa P. Jackson to make this proposed positive finding would be unreasonable, unlawful, and arbitrary and capricious.

I. About The Heartland Institute

The Heartland Institute is a national nonprofit research and education organization, tax exempt under Section 501(c)3 of the Internal Revenue Code, headquartered in Chicago, and founded in 1984. It is not affiliated with any political party, business, or foundation.

Heartland’s mission is to discover, develop, and promote free-market solutions to social and economic problems. Such solutions include market-based approaches to environmental protection, privatization of public services, parental choice in education, personal responsibility
in health care, and deregulation in areas where property rights and markets do a better job than government bureaucracies.

Heartland’s nearly 200 free-market policy experts—managing editors, senior fellows, policy advisors, and contributing editors—are able to provide testimony, articulate issue positions through the media, and help educate in other ways policymakers at all levels of government in the fifty states and Washington, D.C. Our policy advisors are academics and professionals including members of the faculties of Harvard University, Georgetown University Law Center, the Massachusetts Institute of Technology, The University of Chicago, The University of Chicago Law School, UCLA School of Law, Northwestern University, and scores of other respected universities. In addition, approximately 150 elected officials – Democrats as well as Republicans – serve on Heartland’s Board of Legislative Advisors.

Our publications are distributed to approximately 8,300 state and national elected officials and 8,400 local government officials. Heartland also communicates with media, civic and business leaders, educators, other groups, and the general public.

The Heartland Institute seeks to bring sound science and economics to the debate on environmental issues. We believe there is too much alarmism in these debates and too little attention being paid to the real science. In the specific case of global warming, Heartland has been a major source of research and commentary in the U.S. questioning whether enough is known about climate change to justify government action. As this comment demonstrates, consideration of all relevant peer-reviewed academic articles on an array of climate change issues mandates that EPA abandon its attempts to regulation anthropogenic emissions of greenhouse because of the extreme uncertainty that these emissions cause or contribute to air pollution.

In recent years, Heartland has been providing a platform for the so-called "skeptics" in the global warming debate, among other reasons, because (a) it is apparent that the proposed assertion of federal governmental powers over human-induced greenhouse gas emissions exploits the public’s scientific illiteracy to advance the government’s agenda; and (b) the economic consequences of greenhouse gas emission regulatory programs on the scale proposed by EPA in this rulemaking and in the Advanced Notice of Proposed Rulemaking, EPA-HQ-OAR-2008-0318-0117 (“ANPR”), Regulating Greenhouse Gas Emissions Under the Clean Air Act would be devastating. Heartland has hosted three international conferences in New York and Washington in 2008 and 2009, bringing together hundreds of scientists, economists, and policy experts to explore issues ignored by the IPCC in its reports.

Heartland has published and disseminated numerous books and studies on climate change and global warming, including Heartland’s monthly newspaper Environment and Climate News; James M. Taylor, J.D., What Climate Scientists Think about Global Warming (Heartland Institute, 2007); S. Fred Singer and Dennis T. Avery, Unstoppable Global Warming: Every 1,500 Years (Rowman & Littlefield Publishers, Inc. 2007); Joseph L. Bast, James M. Taylor, and Jay Lehr, State Greenhouse Gas Programs: An Economic and Scientific Analysis (Heartland Institute, 2003); Joseph L. Bast, New Source Review: An Evaluation of EPA’s Reform Recommendations (Heartland Institute, 2002). In 2008, Heartland published S. Fred Singer, ed., Nature, Not Human Activity, Rules the Climate, a summary report for policymakers from the Nongovernmental International Panel on Climate Change.
In June 2009, Heartland published *Climate Change Reconsidered: The 2009 Report of the Nongovernmental International Panel on Climate Change* (henceforth “the NIPCC Report”), in which coauthors Dr. S. Fred Singer and Dr. Craig Idso and 35 contributors and reviewers present an authoritative and detailed rebuttal of the findings of the United Nations’ Intergovernmental Panel on Climate Change (IPCC), on which EPA is relying for this proposed Endangerment Finding and its other greenhouse gas regulatory proposals. The scholarship in this book demonstrates overwhelming scientific support for the position that the warming of the twentieth century was moderate and not unprecedented, that its impact on human health and wildlife was positive, and that carbon dioxide probably is not the driving factor behind climate change.

A copy of the NIPCC Report is attached to and submitted as part of this comment. Heartland also urges EPA to review additional publications as they become available, posted at http://www.co2science.org/.

Further information about Heartland’s work on climate change is available at http://www.globalwarmingheartland.org/ and http://www.nipccreport.org/

II. Introduction

The issue in this rulemaking is whether the Administrator should make a finding that six greenhouse gases “cause” or “contribute” to “air pollution” that “may reasonably be anticipated to endanger public health or welfare” under Section 202(a) of the Clean Air Act. She has proposed a positive Endangerment Finding. 74 Fed. Reg. 18886. This proposed finding has ramifications well beyond this rulemaking because it will trigger a cascade of regulation of these greenhouse gas emissions under other sections of the Act.

The Clean Air Act provides that the courts may reverse EPA regulations that are unreasonable and arbitrary and capricious. This comment proves that the science cited by EPA as supposedly supporting the proposed positive finding is wholly insufficient, and therefore a positive endangerment finding would be subject to judicial reversal on these grounds.

Furthermore, federal guidelines, including those of EPA itself, require that “influential” rulemakings like this one be based on data that is “accurate, clear, complete, and unbiased.” This data must also be collected by the “best available methods.” The data must also be the most recent available. EPA’s data fail to meet these requirements.

As demonstrated below and in the NIPCC Report, EPA has failed to consider a vast body of peer-reviewed academic research relevant to this rulemaking. These studies demonstrate, among other things, that EPA’s computer models are incapable of accurately simulating past temperatures and thus cannot be used to predict future temperatures. EPA even admits there are substantial uncertainties in these models.

EPA’s contentions that the global warming of the twentieth century was caused by human activity and that human emissions will cause future warming are undermined by an extensive
body of scientific research pointing to natural forcings and feedback effects that are not taken into account by computer models. Some of these forcings and effects are sufficiently large to entirely explain the warming of the twentieth century or to entirely offset any human effect due to CO₂ emissions.

EPA relies on a piece of research – the so-called “hockystick” diagram by Mann et al., to support its claim that the warming of the twentieth century was unprecedented. But this study is widely discredited in the academic literature. Similarly, extensive observational data contradicts EPA’s contentions that there has been any human effect on the rate at which glaciers have melted since the last Ice Age, sea levels have risen, or precipitation has increased or become more extreme.

The connection between carbon dioxide levels in the atmosphere and global temperatures is much more complex, and probably much weaker, than EPA assumes. Many paleoclimatologic studies find warming temperatures preceded rather than followed elevated carbon dioxide concentrations. EPA also fails to consider research by solar scientists who find that temperatures correlate more closely with solar cycles than anthropogenic greenhouse gas emissions.

The Heartland Institute has published a 737-page report, titled Climate Change Reconsidered: The 2009 Report of the Nongovernmental International Panel on Climate Change (“NIPCC Report”) that documents the statements made in this comment and comprehensively refutes the claims contained in EPA’s Endangerment Finding.

The scientific positions described in this comment and in the NIPCC Report are entirely within the mainstream of the scientific community. Besides the thousands of source citations to peer-reviewed scientific journal articles contained in the NIPCC Report is the fact that more than 31,000 scientists have signed a petition saying “there is no convincing scientific evidence that human release of carbon dioxide, methane, or other greenhouse gases is causing, or will in the foreseeable future, cause catastrophic heating of the Earth's atmosphere and disruption of the Earth's climate.” The complete text of that petition, an explanation of how it was circulated, and a directory of all 31,478 American scientists who signed it appears in Appendix 4 of the NIPCC Report. There is no similar summary of alarmist science that has been signed by anywhere near 31,000 scientists. In contrast, the IPCC, upon which EPA heavily relies, lists only 2,400 participants, many of whom are not scientists and many of whom disagree with the alarmist conclusions asserted by the relative handful of lead authors who composed the final documents.

The core issue in this rulemaking is, as noted above, whether man-induced greenhouse gas emissions cause or contribute to a threat to human health or welfare. A fair evaluation by EPA of the entire body of relevant, peer-reviewed academic research should lead it to conclude that they do not, and the proposed finding ought to be withdrawn.

III. EPA Has Failed to Provide Notice and a Meaningful Opportunity to be Heard During this Rulemaking in Violation of Law and the U.S. Constitution.

A. The Notice Provided for this Rulemaking Was Defective.
The official Federal Register notice for this rulemaking, dated April 24, 2009, informed the public that comments could be submitted by e-mail to GHG--Endangerment-Docket@epa.gov. 74 Fed. Reg. 18886. This address is incorrect; e-mails using it are not transmitted to EPA. The correct address is GHG-Endangerment-Docket@epa.gov (with one dash rather than two dashes between “GHG” and “Endangerment”). Due to this error, an unknown number of interested persons have been deprived of the opportunity to comment.

If EPA's erroneous e-mail address is not corrected and republished, if the comment period for this rulemaking is not extended, and if the Administrator finalizes her Endangerment Finding, this rulemaking will be subject to reversal because EPA and the Administrator have violated the Due Process Clause of the U.S. Constitution, the procedures required by the Clean Air Act, the Administrative Procedure Act, and Executive Order Number 12866.

The Due Process Clause of the Fifth Amendment guarantees that “no person shall . . . be deprived of life, liberty, or property, without due process of law.” “A fundamental requirement of due process is ‘the opportunity to be heard.’ It is an opportunity which must be granted at a meaningful time and in a meaningful manner.” Armstrong v. Manzo, 380 U.S. 545, 552 (1965). The opportunity to submit a comment by e-mail that cannot reach EPA and remains floating in the ether is the exact opposite of meaningful.

The Clean Air Act provides that “the Administrator shall allow any person to submit written comments, data, or documentary information…” in a rulemaking process like this one. 42 U.S.C. §7607(d)(5)(i)(emphasis supplied.) The Administrative Procedure Act, which is applicable to EPA, provides that EPA “shall give interested persons an opportunity to participate in the rule making through submission of written data, views, or arguments with or without opportunity for oral presentation.” 5 U.S.C.S. §553(c)(emphasis supplied). This provision is mandatory by its plain terms, not discretionary. The APA further provides that Federal Register notice must be given of: “the established places at which . . . the public may . . . make submittals . . . .” 5 U.S.C.S. §552(a)(1)(A). EPA and the Administrator have violated these provisions.

Furthermore, as the EPA Guidelines recognize, Executive Order Number 12866 dated October 4, 1993, applies to this rulemaking. This Order requires that an agency like EPA “shall (consistent with its own rules, regulations, or procedures) provide the public with meaningful participation in the regulatory process.” 58 Fed. Reg. 51735. This provision too has been

1 Although the Clean Air Act contains its own procedural provision, 42 U.S.C.S. 7607, this section applies in addition to the Administrative Procedure Act (APA). Small Refiner Lead Phase-Down Task Force v. U.S. EPA, 705 F.2d 506, 522-23 (D.C. Cir. 1983)(“At a minimum, failure to observe the basic APA procedures, if reversible error under the APA, is reversible error under the Clean Air Act as well”).

2 The right to comment “is not meager. The right to comment better grounds agency action in the actual values and interests of the people subject to the action and it better ‘assure[s] that the agency will have before it the facts and information relevant to a particular administrative problem, as well as suggestions for alternative solutions. The courts, therefore, will not credit rulemaking as ‘fully reasoned’ unless the agency takes into account the data and critical analysis and identification of interests and priorities as offered by public comment.” Alfred C. Aman, Jr., and William T. Mayton, Administrative Law at 54 (West Group 2001)(internal citations omitted).
There is a pattern here: The same thing happened during the ANPR comment period, when EPA also provided an erroneous e-mail address in the Federal Register notice. (See 73 Fed. Reg. 44354 (July 30, 2008) and Heartland’s submittal dated November 28, 2008.) Where, as here, a vast new regulatory regime is proposed, imposing new Clean Air Act control measures that will cost many trillions of dollars, the process leading to such regulation ought not be tainted in any way. EPA ought to republish the Endangerment Finding in the Federal Register with the correct e-mail address. It should also extend the deadline for submission of comments for at least 60 days. This is an important issue to every person in this country, and EPA owes it to the American public to give every interested person the opportunity to be heard.

B. There Is No Meaningful Opportunity to Be Heard.

Pursuant to Executive Order Number 12866 dated October 4, 1993, and Sections 6.2 and 6.3 of EPA Information Quality Act Guidelines, discussed below, information disseminated by EPA in a rulemaking that has “an annual effect on the economy of $100 million or more or adversely affect[s] in a material way the economy, a sector of the economy, productivity, competition, [or] jobs” is “influential” and thus subject to particularly rigorous data quality standards. 58 Fed. Reg. 51735. Further, as just noted, Executive Order Number 12866 and Due Process require a meaningful opportunity to be heard.

EPA has proffered hundreds of thousands of pages of scientific data in support of the proposed Endangerment Finding. Tens of thousands of pages of this data – primarily from the Climate Change Science Program – has been published in the past year and was not available in the ANPR process. Yet EPA has provided merely 60 days for review of and comment on this massive quantity of information.

When regulations implicating not millions or billions but rather many trillions of dollars in economic costs are proposed, EPA owes the American public a comment period of ample length to enable the public to participate in a meaningful way. EPA ought to extend the comment period for at least another 60 days.


A. EPA’s Proposed Endangerment Finding Data Violates OMB’s Information Quality Act Guidelines.

These comments shall prove that the data EPA relies on for its proposed Endangerment Finding violate the Information Quality Act. (Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (P.L. 106-554).) The proposed Endangerment Finding thus is void.

The Act directs federal agencies to maximize “the quality, objectivity, utility, and integrity” of
information they prepare and disseminate and requires agencies to adopt and follow implementing guidelines. Information must be “accurate, clear, complete, and unbiased.” *Id.*

As detailed in the NIPCC Report and this comment, EPA’s data is biased, incomplete, and inaccurate. The scientific research on which the proposed Endangerment Finding is based was promulgated by the IPCC and dates to the year 2006 at the latest. The data is inaccurate, as the NIPCC Report demonstrates. EPA’s data are incomplete because they omit the wealth of scientific research identified and discussed in the NIPCC Report casting profound doubt on whether global warming results from anthropogenic emissions of greenhouse gases. For these reasons, the OMB guidelines are violated.

In addition, when EPA engages in “analysis of risks to human health, safety and the environment,” it is required by the Office of Management and Budget’s guidelines to apply the principles enacted by Congress in the Safe Drinking Water Act, 42 U.S.C. §300g-1(b)(3)(A) and (B). 67 Fed. Reg. 8458-60. This section of the SDWA requires EPA to use only:

[T]he best available, peer-reviewed science and supporting studies conducted in accordance with sound and objective scientific practices; and

[D]ata collected by accepted methods or best available methods.

42 U.S.C. §300g-1(b)(3)(A). As discussed below, the “best available” data has not been included by EPA in the scientific documents it relies on for this proposed Endangerment Finding. Also, as discussed below, the methods used to collect data – temperature observations now known to be defective and computer models that have been widely discredited – were not the best available.

The SDWA also requires EPA to address: “each significant uncertainty” in assessing public health risks; all studies capable of assisting in resolving the uncertainties; all peer-reviewed studies that “fail to support any estimate of public health effects;” and the methodology by which inconsistent scientific data was reconciled. *Id.*

As noted below, in the TSD and the CCSP data promulgated in support of the proposed Endangerment Finding, significant uncertainties are expressed but not resolved. Also as noted below, there is a vast body of inconsistent scientific data. Again this was not resolved. For these reasons, the Information Quality Act has been violated. The proposed Endangerment Finding is therefore void.

**B. EPA’s Proposed Endangerment Finding Data Violates EPA’s Own Information Quality Act Guidelines.**

As required by the Information Quality Act, EPA has adopted *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by the Environmental Protection Agency* (“EPA Guidelines”). EPA has also violated these guidelines by disseminating flawed and incomplete scientific data.

EPA’s guidelines require that the information it disseminates maximizes “quality” and
“objectivity.” “Objectivity focuses on whether the disseminated information is being presented in an accurate, clear, complete, and unbiased manner, and as a matter of substance, is accurate, reliable, and unbiased.” EPA Guidelines at §5.1.

EPA’s guidelines define a “top Agency action” to include a rulemaking such as this one because it is involves “highly controversial” science and economic issues and will have “potentially great or widespread impacts on the private sector….” Thus, the information disseminated as part of this rulemaking is, under the definitions in the EPA Guidelines, “influential.” EPA Guidelines at §6.3. Particular rigor is required for influential information:

EPA recognizes that influential scientific, financial, or statistical information should be subject to a higher degree of quality (for example, transparency about data and methods) than information that may not have a clear and substantial impact on important public policies or private sector decisions.

*Id.* But, as noted, the information disseminated in support of this Endangerment Finding fails to meet this standard.

EPA also recognizes its obligations under the SDWA to use the “best available” data in making risk assessments, with the term “available” being defined “the availability at the time an assessment is made.” EPA Guidelines at §6.4. EPA goes on to say it “also recognizes that scientific knowledge about risk is rapidly changing and that risk information may need to be updated over time.” *Id.* As noted, the data on which the proposed Endangerment Finding is based dates to 2006, for the most recent.3 As noted in the NIPCC Report, the state of scientific knowledge about the risk of global warming is changing rapidly. EPA’s data does not meets its obligations under the SDWA. The proposed Endangerment Finding therefore is void.

V. EPA’s Proposed Endangerment Finding and Its Underlying Science Documents Violate the Clean Air Act’s Prohibition of Regulations That Are Unreasonable, Arbitrary, and Capricious.

A court may reverse EPA regulations that are:

(A) arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law;

(B) contrary to constitutional right, power, privilege, or immunity;

(C) in excess of statutory jurisdiction, authority, or limitations, or short of statutory right . . . .

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3 The new CCSP products were published in 2008 and 2009 but, as in the case of the EPA Technical Support Document for this proceeding, these products are based on academic research as of 2006.
42 U.S.C. §7607(d)(9). Also, as noted above, the Administrator may make a positive endangerment finding only for emissions “which may reasonably be anticipated to endanger public health or welfare. 42 U.S.C. §7521(a). For the reasons set forth in this comment, including the NIPCC Report, the proposed Endangerment Finding violates these provisions.

VI. **EPA Engages in Clear Legal Error by Enabling the Administrator to Make an Endangerment Finding Based on Low Likelihood that Climate Change Is Driven by Anthropogenic Emissions of Certain Greenhouse Gases.**

In proposing her Endangerment Finding, the Administrator uses the legislative history of Section 202(a) of the Clean Air Act, 42 U.S.C. §7521(a)(1) to interpret the terms “judgment” and “endanger” in that statute. Based on this legislative history, she contends she is authorized to based her Endangerment Finding on “projections, assessments and estimates,” to “extrapolate from limited data,” and to balance the likelihood and severity of effects:

This balance involves a sliding scale; on one end the severity of the effects may be significant, but the likelihood low, while on the other end the severity may be less significant, but the likelihood high. Under either scenario, the Administrator is permitted to find endangerment. If the harm would be catastrophic, the Administrator is permitted to find endangerment even if the likelihood is small. in making her endangerment finding.

74 Fed. Reg. 18891-92. EPA’s use of legislative history is clear legal error, however.

Section 202(a) provides:

The Administrator shall by regulation prescribe (and from time to time revise) in accordance with the provisions of this section, standards applicable to the emission of any air pollutant from any class or classes of new motor vehicles or new motor vehicle engines, which in his judgment cause, or contribute to, air pollution which may reasonably be anticipated to endanger public health or welfare.

*Id.*

Under well-established principles of statutory construction, the legislative history of a statute may not be considered unless the statutory language is ambiguous. *Barnhill v. Johnson*, 503 U.S. 393, 401 (1992 (“[W]e note that appeals to statutory history are well taken only to resolve ‘statutory ambiguity’”). *See also Ratzlaf v. United States*, 510 U.S. 135, 147-48 (1994)(“[W]e do not resort to legislative history to cloud a statutory text that is clear”). There is nothing ambiguous about the terms “judgment” and “endanger” in Section 202(a). The term “judgment” is well-understood to mean a reasoned decision based on facts. The common meaning of

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4 As discussed below, the verb “project” and its derivatives are IPCC-speak for computer modeling, which, in the case of climate change, is seriously flawed.
“endanger” is also clear. It means “to expose to danger, harm, loss; imperil.” (Webster’s New World College Dictionary, 4th edition, Wiley Publishing Co., Inc. (2002).) Thus, use of legislative history here is entirely improper.

Furthermore, use of the legislative history to assert that the Administrator may make a finding based only on slight certainty of harm is plainly not what Congress authorized in enacting this provision. Rather, Congress authorized her to make a decision based on facts—a “judgment”—that harm to human health and welfare is reasonably likely. As submitted in this comment, science relied on by EPA, as well as the vast body of academic scientific peer-reviewed research that EPA ignored, cannot support such a judgment.

VII. EPA’s Reliance on Computer Models is Unreasonable, Arbitrary, and Capricious.

EPA can regulate only those air pollutants the Administrator finds “in his judgment cause, or contribute to, air pollution” and only when those pollutants “may reasonably be anticipated to endanger public health or welfare.” 42 U.S.C. §7521(a)(1).

EPA’s entire rationale for regulating the six specified greenhouse gases rests upon its adoption of 2007 Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) (“IPCC AR4”) computer models. These models purport to show the globe has warmed in past decades due to anthropogenic emissions of these gases and will continue to do so in the future, with allegedly catastrophic impacts on human health and welfare. The computer modeling from IPCC AR4 was conducted prior to 2006. EPA conducted no modeling of its own. In light of the known deficiencies of IPCC’s computer models, described below, EPA’s failures to consider more recent data and to conduct its own modeling means that its proposed Endangerment Finding is legally insufficient and arbitrary and capricious.

As the D.C. Circuit has recognized in a case under a different section of the Clean Air Act, to be valid drivers of regulation, computer models must be continuously updated and verified:

Congress intended that monitoring would impose a certain discipline on the use of modeling techniques, which would be the principal device relied upon for the projection of the impact on air quality of emissions from a regulated source. This projects that the employment of modeling techniques be held to earth by a continual process of confirmation and reassessment, a process that enhances confidence in modeling, as a means for realistic projection of air quality


Because this computer modeling is deficient and unreliable in numerous important respects, as EPA concedes and the NIPCC Report proves, the proposed finding is unreasonable and arbitrary and capricious.

EPA’s discussion of the modeling used is abbreviated; EPA merely adopts the modeling used in the IPCC AR4 and adds a few comments from the Climate Change Science Program Synthesis and Assessment Products. Even this abbreviated discussion, however, demonstrates that modeling done to date is utterly and fatally flawed and that the Administrator cannot use it to reasonably support her proposed Endangerment Finding.

EPA itself admits in the Technical Support Document for this rulemaking that computer models are defective in numerous important respects, including but not limited to the 13 defects described immediately below. *Endangerment and Cause and Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act (“TSD”).*

First, the models can accurately simulate future climate changes only if they can accurately simulate the current and past climate. (TSD at 39.) EPA says it has “considerable confidence” in the models’ predictions of the future. (TSD at 52.) But the Climate Change Science Program assessment of computer modeling, incorporated into the TSD, doesn’t share EPA’s opinion on simulation accuracy. CCSP states:

> Climate modeling has been steadily improving over the past several decades, but the pace has been uneven because several important aspects of the climate system present especially severe challenges to the goal of simulation.

Simulations from different state-of-the-science models have not fully converged, however, since different groups approach uncertain model aspects in distinctive ways. This absence of convergence is one useful measure of the state of climate simulation; convergence is to be expected once all climate-relevant processes are simulated in a convincing physically based manner. However, measuring the quality of climate models so the metric used is directly relevant to our confidence in the models’ projections of future climate has proven difficult. The most appropriate ways to translate simulation strengths and weaknesses into confidence in climate projections remain a subject of active research.

*Climate Models: An Assessment of Strengths and Limitations,* U.S. Climate Change Science Program Synthesis and Assessment Product 3.1 at 1, 4 (2008). Furthermore, as noted below, EPA’s models are significantly flawed in past and present climate simulations.

Second, EPA concedes computer modeling does not result in definitive projections of future climate change. Computer models use “scenarios,” EPA says, which “are story lines regarding possible futures. These storylines are designed to be internally consistent in their assumptions regarding population and economic growth, implementation of policies, technology change and adoption, and other factors that will influence emissions. *Scenarios are not projections of the future, but are used to illustrate how the future might look if a given set of events occurred and policies implemented.*”(TSD at 46; emphasis supplied.) Despite this caution, the TSD uses the word “project” or its derivatives more than 285 times in discussing future climate change. *(See TSD generally.)*
Third, EPA says clouds are not well represented in the computer models, leading to “uncertainties” in predicting how much climate change will take place in the future and the timing of any climate change. (TSD at 52.)

Fourth, there are “uncertainties” about composition and distribution of past aerosol emissions in the paleoclimate records. (TSD at 15.) There are also “uncertainties” in the models of future aerosol effects on climate and the interaction of aerosols with clouds, which “potentially can change cloud radiative properties and cloud cover.” This is “a major stumbling block,” EPA admits. (TSD at 52.) As discussed below, clouds exert considerable cooling effects. Their underrepresentation in the models is a significant defect which disqualifies use of these models in this Endangerment Finding.

Fifth, “[t]here are still large uncertainties associated with current inventories of BC and OC, the ad hoc scaling methods used to produce future emissions, and considerable variation among estimates of the optical properties of carbonaceous aerosols. Given these uncertainties, future projections of forcing by BC and OC are quite dependent on the model and emissions assumptions (Meehl et al., 2009). Similarly, CCSP (2008d) concluded that one of the most important uncertainties in characterizing the potential climate impact of aerosols is the projection of their future emissions.” (TSD at 48.)

Sixth, the models are global and are not accurate at regional levels or over time periods of less than 50 years. “Attribution at these scales, with limited exceptions, has not yet been established.” (TSD at 42.)

Seventh, projections of precipitation are “problematic” in some cases. (TSD at 52-53.) This is a serious defect because, as discussed below, precipitation is a major driver of weather and climate.

Eighth, EPA notes “an important inconsistency may have been identified in the tropics.” Observation shows more surface warming, rather than tropospheric warming, while models simulate the opposite—more tropospheric warming than surface warming. EPA says one possible explanation is observational errors, but adds “the issue is still under investigation.” (TSD at 41.)

Ninth, current modeling does not distinguish between natural and human-induced changes in hurricane activity, so “a confident assessment of human influence on hurricanes” requires further study. (TSD at 42.)

Tenth, “[t]here is no clear evidence to date of human-induced global climate change on North American precipitation amounts.” (TSD at 43.)

Eleventh, EPA notes CCSP states that models of glacial ice are “in their infancy” and that “recent evidence for rapid variations in this glacial outflow indicates that more-realistic glacial models are needed to estimate the evolution of future sea level.” (TSD at 57.)
Twelfth, EPA notes sulfates and black carbon “may significantly influence 21st century climate change” and could be responsible for 40 percent of U.S. summer warming by 2100 and a decrease in precipitation. But one simulation shows this “could” cause up to 40 percent of continental U.S. summer warming by 2100 and decrease in precipitation. But there is no “consensus” due to “uncertainties about different pollution control storylines.” (TSD at 60.)

Thirteenth, by its own admission, IPCC models (and thus EPA) considered only two natural forcing agents: solar activity and volcanoes. (TSD at 41.) As discussed below, there are numerous other natural forcing agents EPA should have considered.

B. EPA Ignores These Deficiencies in Adopting Wholesale the “Unequivocal” IPCC Projections that Global Warming and Its Consequences Are Occurring Due to Anthropogenic Greenhouse Gas Emissions.

Unrestrained by the defects in its computer modeling, both as to simulations of past and current climate and predictions of the future, EPA nevertheless finds warming is “very likely” to occur in the 21st century with dire consequences for this nation. In light of the broad array of errors that even EPA admits exist in modeling, EPA’s certainty that this parade of horribles will occur is simply astonishing.

Among other predictions, EPA lists the following.

First, emissions of greenhouse gases at or above the current rates will “very likely” cause future warming larger than in the 20th century. All North America is “very likely to warm” more than global mean warming. (TSD at 45, 53, 57.)

Second, despite “significant limitations,” including lack of cloud representation, computer models “provide credible quantitative estimates of future climate change” and “a robust and unambiguous picture of significant climate warming in response to increasing greenhouse gases.” (TSD at 52.)

Third, precipitation is “very likely” to increase in all of North America except in the south and southwest portions due to global warming, according to models. Models simulate global mean precipitation increases with global warming. Global intense precipitation events will result in deaths, injuries, infectious diseases, intoxications and mental health problems (Confalonieri et al, 2007). Flooding may also lead to contamination of waters with dangerous chemicals, heavy metals, or other hazardous substances, from storage or from chemicals already in the environment (Confalonieri et al, 2007). (TSD at 56, 59, 62, 69.)

Fourth, “models suggest that human-induced climate change is expected to alter the prevalence and severity of many extreme events such as heat waves, cold waves, storms, floods, and droughts.” (TSD at 61.)

Fifth, sea levels are projected to rise by between 0.18 and 0.59 meters, compared with the base period of 1980 to 1999, according to the IPCC AR4, but may “substantially exceed these levels” due to melting of the Greenland and Antarctic ice sheets. Sea levels could rise up to one meter. (TSD at 56, 61.)
Sixth, there will be a “likely increase in intense tropical cyclone activity” which is linked to increased risk of deaths, injuries, water and foodborne disease and post-traumatic stress disorders. (TSD at 72.)

Seventh, droughts are “likely to increase,” though not “likely” in the United States. (TSD at 72.)

Eighth, changes in temperature and precipitation are projected as “likely to increase wild fires, leading to increased eye and respiratory illnesses and injuries, burns, smoke inhalation. (TSD at 72.)

Ninth, the spread of several food and water-borne pathogens will “likely” increase. (TSD at 73.)

As discussed above, the predictive value of computer models is only as good as their ability to reconstruct the past. Since the computer models EPA relies on do not accurately simulate the past, EPA’s use of them to predict the future—for the purpose of imposing a regulatory scheme that will cost all Americans trillions of dollars—is unreasonable, arbitrary and capricious. EPA should withdraw the Endangerment Finding.

C. EPA Failed to Consider and/or Correctly Interpret Peer-Reviewed Scientific Research that Proves the IPCC’s Computer Models Are Unreliable.

The IPCC computer models adopted without evaluation by EPA have been severely criticized by many respected scientists for being too unreliable to form the basis of public policy. Specifically, and as documented below, researchers have found IPCC’s general circulation models (1) are not intended to produce forecasts and are inherently incapable of doing so; (2) fail to replicate real-world conditions, an essential test of reliability; (3) fail to correctly simulate the physics of Earth’s radiative energy balance; (4) fail to properly model cloud formation and cloud-radiation interactions; and (5) fail to simulate even major observed precipitation anomalies, such as the summer monsoon rainfall over the Indian region.

This peer-reviewed research is extensively summarized in Chapter 1 of the NIPCC Report (NIPCC Report at 1-27.) and is briefly summarized here.


Computer models are tools used by scientists to better understand how the climate responds to internal and external “forcings” such as changes in the amount of carbon dioxide and solar radiation. But computer models are nothing more than a statement of how the modeler believes a part of the world works and are not designed to produce scientific forecasts (Bryson, 1993). Forecasting, in contrast, is a scientific discipline (Armstrong, 2001), and one with which the authors of the IPCC reports are apparently unfamiliar. An “audit” of the IPCC AR4 Working Group I’s report — on which the EPA relies heavily—by professional forecasters found no citations to “the primary sources of information on forecasting methods” and “the forecasting procedures that were described [in sufficient detail to be evaluated] violated 72 principles. Many of the violations were, by themselves, critical.” (Green and Armstrong, 2007).
2. Failure to Replicate Reality

One way to test a computer climate model is to see if it can replicate real-world conditions. The models used by the IPCC and EPA have been severely criticized for failing to replicate real-world conditions in the articles and books cited here.


A specific example of the failure of models to simulate real-world climate conditions is a test performed by Wielicki et al. (2002), wherein four state-of-the-art climate models and one weather assimilation model failed to reproduce the observed decadal changes in top-of-the-atmosphere thermal and solar radiative energy fluxes that occurred over the past two decades. No significant decadal variability was exhibited by any of the models; and they all failed to reproduce even the cyclical seasonal change in tropical albedo. The administrators of the test concluded that “the missing variability in the models highlights the critical need to improve
cloud modeling in the tropics so that prediction of tropical climate on interannual and decadal time scales can be improved.”


### 3. Radiative Balance

“[U]ncertainties as large as, or larger than, the doubled CO$_2$ forcing could easily exist in our modeling of future climate trends, due to uncertainties in the feedback processes,” wrote J.E. Harries in 2000. Because of the vast complexity of the subject, Harries says, “even if [our] understanding were perfect, our ability to describe the system sufficiently well in even the largest computer models is a problem.” (NIPCC at 12.)

Hartmann, writing in *Science*, says “the models are deficient” and “if the energy budget can vary substantially in the absence of obvious forcing,” as it did over the past two decades, “then the climate of earth has modes of variability that are not yet fully understood and cannot yet be accurately represented in climate models.” The models are particularly poor at explaining evaporation and cloud processes at the tropics, which could act as a natural “vent” or “thermostat” controlling global temperatures.

Cumulative impacts of radiative forcing must be understood and measured before the models can be reliable. Yet one extensive study by Ghan *et al.* (2001) identified a long list of improvements needed in models before such certainty could be achieved, and concluded that “much remains to be done before the estimates are reliable enough to base energy policy decisions upon.” (NIPCC at 13.)


4. Cloud Impacts

A principal reason why the IPCC’s computer models fail is because they cannot correctly model the creation and effects of clouds. Randall et al. (2003) state “the representation of cloud processes in global atmospheric models has been recognized for decades as the source of much of the uncertainty surrounding predictions of climate variability.” They report that “despite the best efforts of [the climate modeling] community ... the problem remains largely unsolved. They say “the large-scale effects of microphysics, turbulence, and radiation should be parameterized as closely coupled processes acting in concert,” but that only a few models have even attempted to do this because “the cloud parameterization problem is overwhelmingly complicated,” and “cloud parameterization developers,” as they call them, are still “struggling to identify the most important processes on the basis of woefully incomplete observations.” They conclude, “a sober assessment suggests that with current approaches the cloud parameterization problem will not be ‘solved’ in any of our lifetimes.” Many other scientists agree. (NIPCC at 16-18.)


The role of the flux of biologically-produced dimethyl sulfide from the oceans and other organic matter into the atmosphere and their influence on cloud formation further complicates the matter of modeling the effects of clouds. O’Dowd et al., writing in 2004, say their data “completely change the picture of what influences marine cloud condensation nuclei given that water-soluble organic carbon, water-insoluble organic carbon and surface-active properties, all of which influence the cloud condensation nuclei activation potential, are typically not parameterized in current climate models.” They say “an important source of organic matter from the ocean is omitted from current climate-modeling predictions and should be taken into account.” (NIPCC at 18.) Other researchers have pointed to other omissions and errors.

5. Models Cannot Simulate or Predict Precipitation

Computer models have been conspicuously unable to simulate participation patterns, even so major an observed precipitation anomaly as the summer monsoon rainfall over the Indian region. This is a major defect of the models because precipitation plays a major role in cooling the atmosphere. For example, the 2004 summer monsoon season of India experienced a 13 percent precipitation deficit that was not predicted by any of the empirical or dynamical models regularly used in making rainfall forecasts (Gadgil et al., 2005). Researchers who performed a historical analysis of the models’ monsoon forecasting skill over the period 1932-2004 found no improvement since the very first versions of the models were applied to the task some seven decades earlier. Id. The models often failed to correctly predict even the sign of the precipitation anomaly, frequently predicting excess rainfall when drought occurred and drought when excess rainfall was received. Once again, other researchers have confirmed this finding. (NIPCC Report at 23-25.)


D. **Summary**

EPA acts in an unreasonable, arbitrary, and capricious fashion when it admits to 13 errors and shortcomings of computer models, yet bases on those very models its forecast of negative consequences on human health and welfare. Its review of the scientific literature is biased, incomplete, and unreliable because it overlooks or misinterprets the extensive body of peer-reviewed literature exposing the errors and limits of attempting to make predictions on the basis of computer models.

As the NIPCC Report concludes: “Climate models currently do not provide a reliable scientific basis for implementing programs designed to restrict anthropogenic CO2 emissions. The cloud parameterization problem by itself is so complex that no one can validly claim that humanity’s continued utilization of fossil-fuel energy will result in massive counter-productive climatic changes. There is no justification for that conclusion in reliable theoretical models.” (NIPCC Report at 21.)

VIII. **EPA’s Proposed Endangerment Fails to Give Sufficient Weight to Natural Feedback Factors and Forcings.**

EPA opines “that it is very unlikely that the global pattern of warming observed during the past half century is due” to natural forcings. The primary natural forcings considered by EPA are solar activity and volcanoes. (TSD at 41.) EPA mentions increases in aerosols (primarily sulfate, organic carbon, black carbon, nitrate and dust) as producing cooling, but calls these “the dominant uncertainty in radiative forcing” and assumes, unreasonably, that they are too small to matter. (TSD at 22.)

EPA adopts, uncritically, the IPCC’s conclusion that “if CO2 concentrations were to double, the rise in global average surface temperature “is likely to be in the range 2°C to 4.5°C with a best estimate of about 3°C, and is very unlikely to be less than 1.5°C [italics in the original]” (NIPCC Report at 27.)

But EPA failed to consider other natural feedbacks and forcings, some of which may totally offset the forcings from rising CO2 levels. Seven such factors and forcings identified by the authors of the NIPCC Report are: (A) a natural heat vent over the tropics; (B) cooling from
increased plant emissions of sulfate aerosols; (C) increased photosynthesis from diffuse light; (D) Iodine compounds emitted from marine algae; (E) declining methane concentrations; (F) increased dimethyl sulfide emissions from oceans; and (G) natural and anthropogenic aerosol emissions.

If any of these feedbacks and forcings play a larger role than EPA and the IPCC assume, then the role played by rising CO₂ must be correspondingly smaller, and EPA’s endangerment finding is based on inaccurate or incomplete data. Since EPA and IPCC unreasonably ignore or underestimate the consequences of all of these feedbacks and forcings, it follows that the EPA endangerment finding is not scientifically valid.

A. A natural heat vent over the tropics

Scientists have discovered a “natural heat vent” in the tropics, the eastern part of the west Pacific, and three regions in the U.S., Turkey, Canada, and Australia. When sea surface temperatures reach a certain level, evaporation and wind currents change to affect cloud cover, resulting in the release of more heat into space and a natural cooling of sea surface and the Earth’s atmosphere. The exact functioning of this process is still unknown, but evidence of its existence is widely acknowledged in the peer-reviewed scientific literature. (NIPCC Report at 16, 17.)


B. Sulfate Aerosols

Plants, like clouds, may act as a “biothermostat.” Kuhn and Kesselmeier (20002) found lichens absorb carbonyl sulfide (OCS) from the atmosphere at a rate that gradually doubled when ambient temperatures rose from 3° to 25° C., but as temperatures increased still further, this absorption precipitously declined until it was at zero at 35° C. This suggests “the thermoregulatory function of the biosphere may well be powerful enough to define an upper limit above which the surface air temperature of the planet may be restricted from rising, even...
when changes in other forcing factors, such as increases in greenhouse gas concentrations, produce an impetus for it to do so.” (Kuhn and Kesselmeier, 2000)

EPA states that aerosol masses in the atmosphere are primarily sea salt and dust. (TSD at 15.) Furthermore, EPA considers in the TSD only the effect of anthropogenic emissions of aerosols and wholly ignores sources and the impacts of entirely natural aerosols (including but not limited to sea salt and dust.). (TSD at 15, 21, 41, 48, 53.) But the lichens described above, and other plants described below, demonstrate that there are natural sources of aerosols that may have much larger impacts on climate.

Atmospheric CO₂ enrichment augments plant growth, which in turn increases vegetative input of organic matter to soils. This organic matter tends to increase emissions from soils of sulfur gases such as carbonyl sulfide (OCS). This sulfur gas makes its way to the stratosphere, where it is transformed into solar reflecting sulfate aerosol particles, thus cooling the earth. (NIPCC Report at 29.)

The NIPCC Report concludes that “[T]he ‘biothermostat’ effect is complex and needs to be studied further, but any such processes are totally neglected in current state-of-the-art climate models.” (NIPCC Report at 30.) Until these processes are understood and incorporated into models, we cannot be certain how much of the warming of the 20th century, if any, can be attributed to anthropogenic sources.


C. Diffuse Light

As CO₂ enrichment of the atmosphere enhances plant productivity, a five-part negative feedback linkage takes place. As plants are increasingly able to remove more CO₂ from the air, they are
also able to emit gases to the air that are converted to “biosols.” These naturally occurring aerosols then function as cloud condensation nuclei, which produce clouds which cool the earth’s atmosphere. The third linkage is increases in aerosols and cloud particles enhance the diffuse radiation reaching the earth. Enhanced diffuse lighting then reduces shading under the vegetative canopy, the fourth linkage, which increases photosynthesis, the fifth linkage, extracting more CO₂ from the atmosphere. (NIPCC Report at 30-31.) Once again, EPA and the IPCC ignore this negative feedback factor and therefore overstate the role of CO₂.


D. Iodocompounds

Another biological aerosol ignored by EPA is iodine vapor emitted from marine algae. This aerosol functions as cloud condensation nuclei reflecting incoming solar radiation and cooling the planet. Studies have linked increasing levels of iodocompounds to increasing levels of CO₂ in the atmosphere. One team of researchers, Wingenter et al., concluded these compounds “may help contribute to the homeostasis of the planet.” Another team, O’Dowd et al., said changes in cloud albedo “associated with global change” can lead to an increase in global radiative forcing that is “similar in magnitude, but opposite in sign, to the forcing induced by greenhouse gases.” (NIPCC Report at 34-35.)


E. Methane

Methane is a potent greenhouse gas that is produced by natural as well as anthropogenic processes. EPA and the IPCC ignore evidence that as CO₂ concentrations and temperature increase, methane emissions and atmospheric concentrations are likely to decrease, partly offsetting the greenhouse effect. (NIPCC Report at 37-39.)


Methane is naturally removed from the air by a variety of natural processes, including oxidation by methanotrophic bacteria in the aerobic zones of soil. Soil sinks are “ubiquitous” and they are “believed to be equivalent to the annual input of methane to the atmosphere.” (Prinn et al., 1992). There is extensive documentation in the peer reviewed literature that the natural process of methane sequestration will continue to remove this greenhouse gas from the atmosphere in a warmer or higher CO₂ world. (NIPCC Report at 40.)


Finally, there is extensive evidence in the peer-reviewed scientific literature that methane atmospheric concentrations have been declining since the mid-1980s. Growth in methane emissions has been declining between the early 1990s and the mid-2000s, according to EPA. (NIPCC Report at 42-44 and Figure 2.6.2.3.) Spikes in 1991 and 1997-98 may be attributable to El Nino effects. EPA says why this is happening is “not well-understood but are clearly related to the changes in the imbalance between CH₄ sources and sinks.” (TSD at 14.) But as noted above, there are several possible explanations. Regulation of methane emissions in a time of declining increases is arbitrary and capricious.


### F. Dimethyl Sulfide

Warming increases the emission of dimethyl sulfide (DMS) from world oceans. DMS emissions increase formation of cloud condensation nuclei which leads to cloud droplet formation which in turn increases the albedo effect of clouds, which leads to increased cooling. (NIPCC Report at 42-45.)


### G. Natural and anthropogenic aerosols

1. Net effect of aerosols
The IPCC estimates the net effect of all aerosols is to produce a cooling effect, with a total direct radiative forcing of -0.5 Wm$^{-2}$ and an additional indirect cloud albedo forcing of -0.7 Wm$^{-2}$ (IPCC, Fourth Assessment Report (2007), Working Group 1, p. 4). However, the scientific literature indicates these estimates are too low. Many studies suggest the net radiative forcing of aerosols may be as large as, or larger than, the radiative forcing due to atmospheric CO$_2$.


2. **Anthropogenic aerosols**

Manmade aerosol pollution emissions, including particulate matter, may result in significant warming of the planet. For example, much of the surface warming in the U.S. between 1975 and 1994 could be the result of increases in cirrus cloud coverage from airplane contrails, meaning none would be attributable to increased CO$_2$ content in the atmosphere. (Minnis *et al.*, 2004). Schwartz (2004) concluded predictions in climate models of global warming “are limited at present by uncertainty in radiative forcing of climate change over the industrial period, which is dominated by uncertainty in forcing by aerosols.” He adds that if this situation is not improved, “it is likely that in another 20 years it will still not be possible to specify the climate sensitivity with [an] uncertainty range appreciably narrower than it is at present.” This is especially true “if the uncertainty in climate sensitivity is to be reduced to an extent where it becomes useful for formulating policy to deal with global change.”
Yet another type of aerosol that affects the climate – and that is also overlooked by EPA and the IPCC – is nonbiological naturally produced aerosols -- dust. Enormous amounts of dust are transported by wind from arid areas to the oceans and to other continents, affecting cloud formation, cloud albedo, diffused light, plant growth, and other important biological processes that affect climate. (NIPCC Report at 60-61.) EPA in the TSD notes the existence of dust as an aerosol but cites no studies analyzing its impact or noting the need for additional research. (TSD at 15.) Most climate models use oversimplified parameters of some dust characteristics and ignore others, meaning whatever effect dust has on climate is mistakenly attributed to human activity. Failure to acknowledge this limitation of current scientific knowledge is another severe defect in EPA’s scientific research and reason to reject the TSD.


**H. Summary**

EPA, following the lead of the IPCC, assumes that all temperature trends that cannot be explained by climate models must be due to human greenhouse gas emissions. This assumption is false. We have shown that feedback factors and natural radiative forcings that are missing from the computer models either account for some or all of the warming of the second-half of the twentieth century or will have the effect of offsetting some or all future anthropogenic warming. The scientific research is replete with studies proving both statements. EPA simply ignored or overlooked this body of evidence in making its Endangerment Finding. For this reason, the finding is defective and does not supply a reliable basis for policymaking.
IX. EPA’s Claims About Current and Past Temperatures and the Role of Carbon Dioxide in Causing Global Warming Are False.

EPA, citing IPCC AR4, states that “The present atmospheric concentration of CO2 (386 parts per million) exceeds by far the natural range over the last 650,000 years (180 to 300 ppm) as determined from ice cores,” and that these elevated CO2 levels are responsible for warming which is “very likely to have been unprecedented in more than 10,000 years,” causing “unprecedented” warming. (TSD at 13, 19.)

These assertions are contradicted by many authoritative studies that EPA (and the IPCC) disregards. For this reason, the proposed Endangerment Finding violates the Information Quality Act.

A. Paleoclimatic Data Does Not Support the Claim that CO2 Causes Global Warming.

Reconstruction of historical atmospheric CO2 concentrations reveals that carbon dioxide levels have been much higher in the past than the present level of 386 ppm. Rothman reports that the CO2 level “exhibits no systematic correspondence with the geologic record of climatic variations at tectonic time scales.” (Rothman, 2002) A visual examination of Rothman’s plot of CO2 and concomitant major cold and warm periods indicates the three most striking peaks in the air’s CO2 concentration occur either totally or partially within periods of time when earth’s climate was relatively cool.

Studies identify periods of time when CO2 levels were two to four times higher than the current level (Pagani et al., 2005), and these carbon dioxide spikes followed increases in temperature by hundreds or thousands of years. This contradicts EPA’s prime assertion that carbon dioxide and the other specified greenhouse gases drive warming. As the authors of the NIPCC Report conclude, “When temperature is found to lead CO2 by thousands of years, during both glacial terminations and inceptions, it is extremely likely that CO2 plays only a minor role in enhancing temperature changes that are induced by something else.” (NIPCC Report at 65, citations removed.)


**B. Temperatures at the End of the Twentieth Century Were Not “Exceptional.”**

EPA says with a “high level of confidence” that the last several decades of the 20th century have been warmer “than any comparable period during preceding four centuries.” With “[l]ess confidence,” EPA states temperatures were warmer “during the past 25 years than during any period of comparable length since A.D. 900.” (TSD at 26.) In support, EPA cites the National Research Council report *Surface Temperature Reconstructions For the Last 2,000 Years.*
National Academy Press, Washington, DC. (2006). EPA incorporates the following graph from the NRC Report to illustrate its claim that the warming in the twentieth century was “exceptional.”

In fact, there is considerable evidence that temperatures today and at the end of the twentieth century were not exceptional and were well within the range of natural variability. EPA’s own graph shows the warming trend began in the eighteenth century, before human emissions could have played a role. The warmer “Medieval Warm Period,” from about 700 – 1300 A.D., was also obviously due to natural causes.

The graph used by EPA appears to show the highest temperatures of the Medieval Warm Period to be less than temperatures at the end of the twentieth century. If true, this could allow EPA to claim the twentieth century was “exceptional.” But this graph is fraudulent, created by “tacking on” twentieth-century data obtained from surface stations to earlier data obtained from ice cores, tree rings, and other proxies. This technique is the same one used to create the “hockey stick” graph of Michael Mann et al., which in fact is one of the seven lines in the graph (Mann, M.E. and Jones, P.D. 2003. Global surface temperatures over the past two millennia. Geophysical Research Letters 30 10.1029/2003GL017814)

The hockeystick appears in the IPCC reports, but it has been severely criticized and largely discredited by other researchers. McIntyre and McKitrick attempted to use Mann et al.’s data to replicate their results and found they could not do so “due to collation errors, unjustifiable truncation or extrapolation of source data, obsolete data, geographical location errors, incorrect calculation of principal components and other quality control defects.” (McIntyre and McKitrick, 2003, 2005) These criticisms were subsequently confirmed by Wegman et al. (2006). Mann et al. were forced to publish a correction admitting errors in their data, but claimed these errors did not affect their prior results. This claim, too, was quickly debunked. (NIPCC Report at 68-69.)


We know Mann et al. are wrong because more than 660 scientists in 385 countries have produced 200 papers establishing that the MWP exists. Some of the papers are listed below. The vast majority of them agree it was warmer then than it is now. (NIPCC Report at 69-71.) The IPCC and now EPA continue to cite and rely on Mann’s deceptively flawed data despite evidence that it is false. (NIPCC Report at 63-73.) This error is grounds for rejecting EPA’s endangerment finding.


### C. The Twentieth Century Surface Station Record is Unreliable.

EPA states that surface temperatures have increased globally over the past 100 years by about 0.74°C. “The rate of warming in the past 50 years is almost double that over the last 100 years,” EPA states. (TSD at 23.) EPA says it knows this is so because of surface station temperature records kept during this period of time:
Surface temperature is calculated by processing data from thousands of world-wide observation sites on land and sea. Parts of the globe have no data, although data coverage has improved with time. The long-term mean temperatures are calculated by interpolating within areas with no measurements using the collected data available. Biases may exist in surface temperatures due to changes in station exposure and instrumentation over land, or changes in measurement techniques by ships and buoys in the ocean. It is likely that these biases are largely random and therefore cancel out over large regions such as the globe or tropics. Likewise, urban heat island effects are real but local, and have not biased the large-scale trends. (TSD at 22; citations omitted; emphasis supplied.)

This is demonstrably untrue. Almost all near-surface temperature records taken in the past 100 years are from sensors in high-growth urban areas. Global studies find significant warming effects in urbanized areas. One study noted “surface and lower tropospheric warming trends of all industrial regions are greater than the mean warming trend of the earth’s non-industrial regions, and that the difference in warming rate between the two types of land use grows ever larger as the degree of industrialization increases.” (McKitrick and Michaels, 2004) Even in small towns, UHI effects dwarf the contributions of greenhouse gases. (NIPCC Report at 95-97.)

Studies in North America find UHI impacts ranging from 0.82°C to 2.2°C over short periods of time. Since IPCC finds a 100-year temperature rise of only 0.74°C to be due to anthropogenic emissions of greenhouse gases, this is highly significant. “These results indicate just how difficult it is to measure a background global temperature increase that is believed to have been less than 1°C over the past century (representing a warming of less than 0.1°C per decade), when the presence of a mere 4,500 people can create a winter heat island that may be two orders of magnitude greater than the signal being sought.” (NIPCC Report at 97-102.)

Meteorologist Anthony Watts, in a study published this year, enlisted more than 650 volunteers to inspect NOAA and NASA temperature stations throughout the U.S. They found 89 percent of temperature stations failed to meet NOAA’s own siting requirements. Many were located near heat sources such as air conditioner exhaust fans, asphalt parking lots, roads, and buildings. Watts found 68 near sewage treatment plants that emit heat in digesting waste. (NIPCC Report at 102.)


D. EPA Ignores “Fingerprinting” Data from the CCSP and Others
EPA states that “fingerprinting”—the process of matching computer modeling projections with observed realities—determines the accuracy of the models in predicting the warming impacts of future emissions from anthropogenic forces. This is working, EPA says, and there is “clear evidence of human influences on the climate system. EPA notes, however, that:

[An] important inconsistency may have been identified in the tropics. In the tropics, most observational data sets show more warming at the surface than in the troposphere, while almost all model simulations have larger warming aloft than at the surface. A possible explanation for this inconsistency is error in the observations, but the issue is still under investigation. 39-41

This not merely an “inconsistency,” but a significant piece of evidence that cannot be reconciled with the greenhouse theory of global warming that EPA assumes to be correct. It only takes one fact to disprove a theory. The suggestion that observational data may be in error (which EPA references) appears in the executive summary of the Karl et al. CCSP Report but not in the body of that report, meaning the peer-reviewed report does not support the idea that the data, rather than the theory, might be wrong.

All climate models predict that if anthropogenic greenhouse gases are driving climate change, a unique fingerprint must be detected in the tropics through a warming trend that increases with altitude in the troposphere (the vertical area up to about 15 kilometers). Natural forcing will not yield this fingerprint. Comparing models with data observed by balloons establishes no warming, but rather a slight cooling with altitude, as IPCC and CCSP concede.

The failure of the atmosphere in the tropics to show the warming signature that virtually all global warming models predict should occur is a reason to question the validity of both the theory and the models upon which it is built. The authors of the NIPCC Report conclude, “This mismatch of observed and calculated fingerprints clearly falsifies the hypothesis of anthropogenic global warming (AGW). We must conclude therefore that anthropogenic greenhouse gases can contribute only in a minor way to the current warming, which is mainly of natural origin.” (NIPCC Report at 107-08.)


E. EPA’s Claims Regarding Arctic Temperature Trends are False.

EPA states that “[a]verage Arctic temperatures increased at almost twice the global average rate in the past 100 years.” (TSD at 24.) This is contradicted by a vast amount of data demonstrating the Arctic have fluctuated in the past, both warming and cooling, and recently is once again cooling. (NIPCC Report at 115-131.)

1. Greenland

Greenland was colonized around 1000 AD in the Medieval Warm Period by the Norse. They disappeared in the extreme cooling of the Little Ice Age about 400 years later. The climate then warmed from 1925 to 1945 (as EPA concedes (TSD at 24), when carbon dioxide emissions were lower than they currently are. But the climate there is now cooling, when carbon dioxide emissions are higher. (NIPCC Report at 115-18):


2. Rest of the Arctic

Similar temperature patterns are found in the rest of the Arctic, suggesting there has been no sustained warming period in the second half of the twentieth century that could be attributed to human greenhouse gas emissions. (NIPCC Report at 121.)


X. EPA’s Contentions that Observations of Glacier Loss, Sea Ice Loss, Precipitation Increases, and Sea-Level Rise Support Anthropogenic Warming Are Contradicted by Extensive Scientific Research.

EPA states that the direct effects of elevated CO2 concentrations include “loss of sea ice,” “melting glaciers,” and “very large” rises in ocean levels in the U.S. from melting ice sheets in Greenland and West Antarctica, and significantly increased precipitation in North America. (TSD at 32, 103, 114.) There is extensive scientific literature contradicting these claims, meaning there is once again no scientific basis for regulating greenhouse gas emissions. (NIPCC Report at 135-206.)

A. Glaciers

Globally, sparse data exists about glaciers. There are 160,000 glaciers known to exist in the world, but only 42 percent have been inventoried to any degree. There is mass balance data (positive for growth, negative for shrinkage) for only 200 of them for a single year. There is mass balance data for only 42 of them for ten years. This causes an “important problem” which means we know little about glaciers. In the Little Ice Age, glaciers generally gained mass, while during warming periods they lost mass. One study found no trend during the period 1946-1995 when CO2 levels were rising. (NIPCC Report at 136-37.)


Studies show glaciers in Africa have indeed retreated, but not due to any unusual warming that human activities might have caused during the twentieth century. Modern glacier recession on Kilimanjaro began around 1880, approximately the same time the planet began to recover from the several-hundred-year cold spell of the Little Ice Age. Two recent studies concluded that “the reasons for the rapid decline in Kilimanjaro’s glaciers are not primarily due to increased air temperatures, but a lack of precipitation” (Duane et al. (2008)) and “warming fails spectacularly to explain the behavior of the glaciers and plateau ice on Africa’s Kilimanjaro massif ... and to a lesser extent other tropical glaciers.” (Mote and Kaser (2007)) (NIPCC Report at 137-40.)


2. **Antarctica**

In West Antarctica, if glaciers continue to melt at the current rate, sea levels will rise by one millimeter per century (about the size of a paper clip), one study suggests. But many other studies suggest glaciers there operate on time scales of hundreds of thousands of years and have had melted in the Medieval Warm Period and gained mass in the Little Ice Age. (NIPCC Report at 140-42.)


3. **The Arctic**
Computer models predict the first signs of anthropogenic carbon dioxide-induced global warming will be in the polar regions. If true, studies should show the second half of the twentieth century featured unprecedented warming at the poles of the earth. They do not. Rather, they show cycles of retreat and advance over decadal and millennial time periods. “This thermal behavior is about as different as one could imagine from the claim that the warming of the globe over the last two decades of the twentieth century was unprecedented over the past two millennia. Especially is this so for a high-northern-latitude region, where the IPCC claims CO2-induced global warming should be earliest and most strongly expressed.” (NIPCC Report at 144.)


4. Europe

In Europe, some glaciers are melting while others are not. So there is definitely no strong correlation between CO2 emissions and glacier melting. (NIPCC Report at 145-147.)


5. **North America**

Studies show no trend in North America, where some glaciers have added mass while others have lost mass. The glacial retreat in Glacier National Park mostly occurred from 1830 to 1942, a period during which CO$_2$ emissions rose only slightly. (NIPCC Report at 147-49.)


**B. Sea Ice**

EPA cites IPCC computer models that predict more rapid melting of sea ice in the Arctic and Antarctic. (TSD at 30-32.) EPA concedes, however, these models are crude. EPA claims observations show ice in the Antarctic is increasing slightly and decreasing rapidly in the Arctic. (TSD at 30-32) Data reported in the NIPCC Report, however, supports the former observation but contradicts the latter. The NIPCC Report agrees the models are crude.

1. **Antarctic**

The following studies confirm that Antarctic sea ice is growing either in extent or thickness, meaning there are no grounds in data from that part of the world for restricting greenhouse gas emissions.


2. Arctic

“Arctic climate is incredibly complex” and thorough data are not available. No clear long-term trends are detectable because the extent and thickness of Arctic ice varies by location and simultaneously over differing timescales. Describing data previously cited (NIPCC Report at 154-57), the NIPCC Report states:

In light of this litany of findings, it is difficult to accept the claim that Northern Hemispheric sea ice is rapidly disintegrating in response to CO$_2$-induced global warming. Rather, the oscillatory behavior observed in so many of the sea ice studies suggests, in the words of Parkinson (2000b), “the possibility of close connections between the sea ice cover and major oscillatory patterns in the atmosphere and oceans,” including connections with: “(1) the North Atlantic Oscillation (e.g., Hurrell and van Loon, 1997; Johannessen *et al*., 1999; Kwok and Rothrock, 1999; Deser *et al*., 2000; Kwok, 2000, Vinje, 2001) and the spatially broader Arctic Oscillation (e.g., Deser *et al*., 2000; Wang and Ikeda, 2000); (2) the Arctic Ocean Oscillation (Polyakov *et al*., 1999; Proshutinsky *et al*., 1999); (3) a ‘see-saw’ in winter temperatures between Greenland and northern Europe (Rogers and van Loon, 1979); and (4) an interdecadal Arctic climate cycle (Mysak *et al*., 1990; Mysak and Power, 1992).” The likelihood that Arctic sea ice trends are the product of such natural oscillations, Parkinson continues, “provides a strong rationale for considerable caution when extrapolating into the future the
widely reported decreases in the Arctic ice cover over the past few decades or when attributing the decreases primarily to global warming,” a caution with which we heartily agree.

Moreover, it is possible some thinning of Arctic ice took place in the 1990s, but location-specific observational data is contradictory, with some showing thickening. The models came in for criticism (NIPCC Report at 159-61):

Laxon et al. concluded that “errors are present in current simulations of Arctic sea ice,” stating in their closing sentence that “until models properly reproduce the observed high-frequency, and thermodynamically driven, variability in sea ice thickness, simulations of both recent, and future, changes in Arctic ice cover will be open to question.”

Consequently, it is factually incorrect to allege that greenhouse gases must be limited in order to slow or reduce the amount of Arctic sea ice melting that might be occurring.

The NIPCC Report presents sources separately for sea ice extent and sea ice thickness. The following sources are for the extent of Arctic sea ice:


The following source citations are for Arctic sea ice thickness:


C. Sea Level Rise

EPA states “with high confidence” that there is “strong evidence” of gradual global sea level rise in mid-19th and 20th century, after “little change” between 0 AD and 1900 AD. The seas are currently rising at an increased rate, with about 50 percent of the rise due to glacier/ice melting. (TSD at 31-32.) However, once again, peer-reviewed studies contradict EPA’s claims. Most experts in the field report a slow and steady increase in sea level since the end of the last Ice Age, with no sign of a human impact on the trend. There is no evidence that regulating human greenhouse gas emissions would have any effect on sea level.


D. Precipitation

EPA adopts the IPCC forecast of “[s]ignificantly increased precipitation” in eastern North and South America, northern Europe and north and central Asia. The IPCC states there is drying in the Sahel, the Mediterranean, southern Africa and parts of southern Asia that is attributable to global warming. “Precipitation is highly variable spatially and temporally, and data are limited in some regions,” EPA concludes. (TSD at 29.)

The truth is that global data shows slight increases in precipitation with some decreases in some areas in more recent years. Precipitation in the twentieth century was not unusual: droughts and floods were more frequent and more severe in the centuries before human activity could have played an effect. There is no scientific evidence that restricting human greenhouse gas emissions would produce a more favorable pattern of precipitation anywhere in the world. (NIPCC Report at 162-64.)


Studies in the United States over many centuries show both wetter and drier periods, leading academics to conclude natural variations are at work. (NIPCC Report at 171-74.)


Precipitation in the United States shows no discernable impact from greenhouse gas emission increases in the late twentieth century. Precipitation has decreased in the Pacific Northwest, one study found, and there is an ambiguous trend in the Rockies. Other long term studies concluded the United States was “extremely wet” during the Medieval Warm Period. Studies find variability in this country’s precipitation history, including several droughts, one in the 1950s. (NIPCC Report at 162-74.)


II. EPA’s Dismissal of Solar Activity as the Primary Driver of Warming/Cooling Cycles Is Unwarranted and Unwise.

EPA pays insufficient attention to the most important issue before it in the proposed endangerment finding: whether manmade emissions of the six greenhouse gases are the cause of or contribute to global warming (if there is any). EPA is content merely to quote the IPCC AR4 that “Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.” Why is this “very likely? Because IPCC computer models say so, according to EPA. This is not enough science to support a positive Endangerment Finding. As discussed in this submittal, these models are “notoriously unreliable.” (NIPCC Report at 207.) And, as discussed above, it’s far from certain the climate is warming.

What if the climate is influenced more by solar variability than by anthropogenic greenhouse gas emissions? EPA dismisses this possibility, saying only this:

Changes in solar irradiance since 1750 are estimated to cause a radiative forcing of +0.12 (+0.06 to +0.30) W/m². This is less than half of the estimate given in IPCC’s Third Assessment Report (2001), with a low level of scientific understanding (Solomon et al., 2007). Uncertainties remain large because of the lack of direct observations and incomplete understanding of solar variability mechanisms over long time scales. Empirical associations have been reported between solar-modulated cosmic ray ionization of the atmosphere and global average low-level clouds cover but evidence for a systematic indirect solar effect remains ambiguous. The lack of a proven physical mechanism and the plausibility of other causal factors make the association between galactic cosmic ray-induced changes in aerosol and cloud formation controversial (Solomon et al., 2007).

(TSD at 22.)

The NIPCC Report cites scores of recent studies that EPA and the IPCC have ignored. These studies “suggest the IPCC has got it backwards, that it is the sun’s influence that is responsible for most climate change during the past century and beyond.” (NIPCC Report at 207.)


Milankovitch, M. 1941. *Canon of Insolation and the Ice-Age Problem*. Royal Serbian Academy, Belgrade, Yugoslavia.


See also:


XII. Conclusion

For the foregoing reasons, the Administrator’s proposed positive Endangerment Finding is legally insufficient because it is unsupported by sound, accurate, relevant, and recent peer-reviewed scientific data. It would be unreasonable, arbitrary and capricious, and entirely unlawful for her to issue it. The proposed Endangerment Finding should be withdrawn.

Respectfully submitted,

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